School Shop

vol. V no. 3
November, 1945

Plastics in the Vocational School
by Ernest O. Kohl, Jr.
Introducing Textiles in the School Shop
by Arthur F. Ahr
Films for Shop Training —Part III
by Floyde E. Brooker
Drafting-Room Ideas
by Russell R. Mohn

On the cover: Student in the Edward Bok Vocational High School, Philadelphia, engraving a design from a master plate in the plastics shop. See pages 7-9 for a description of this new trade-training program.

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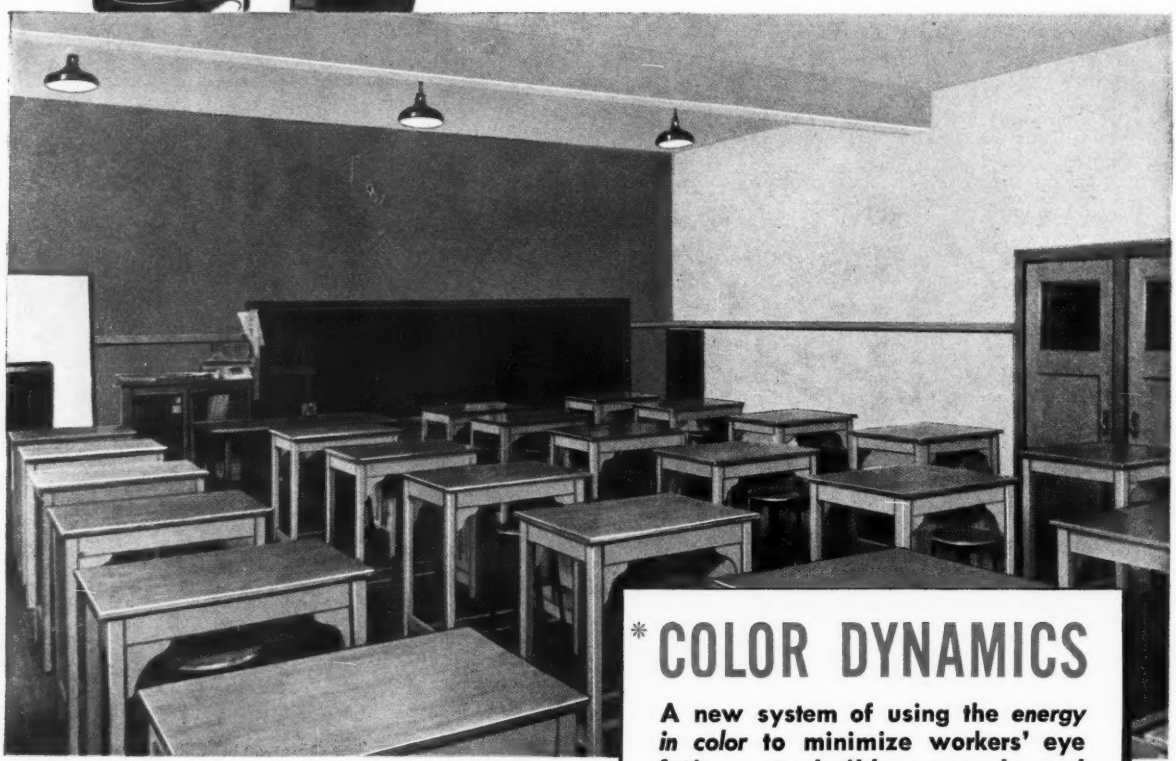

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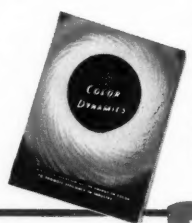

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

November, 1945
Vol. V, No. 3

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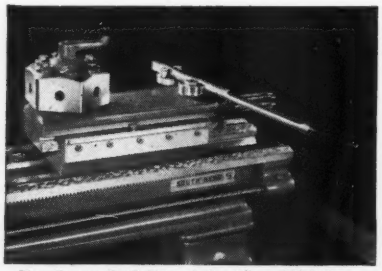

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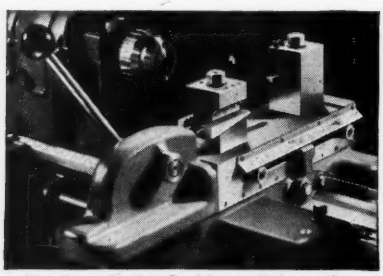

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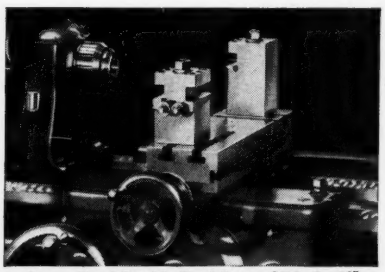
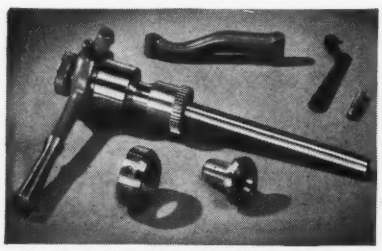


Screw Feed Double Tool Cross Slide for 16" lathes has both manual and power cross feed. Large graduated feed dial.



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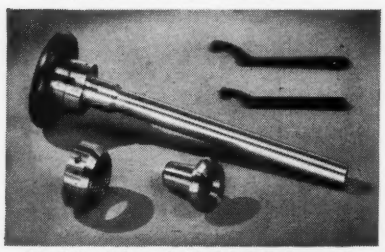
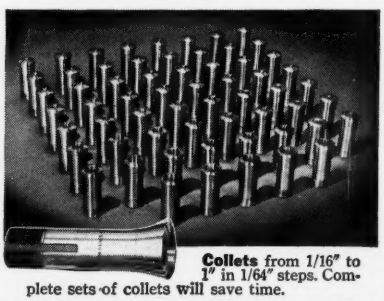


Handwheel Draw-in Collet Attachment is ideal for production and toolroom work that requires extremely close tolerances.



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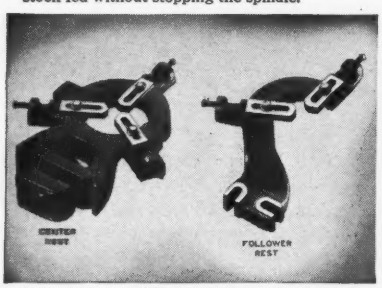
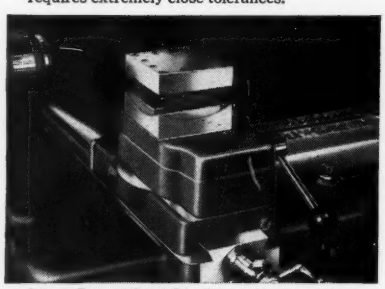
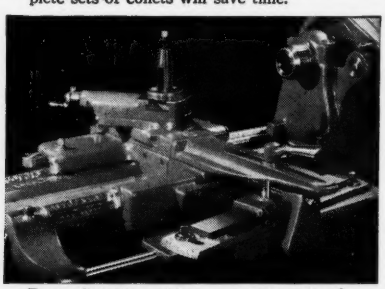


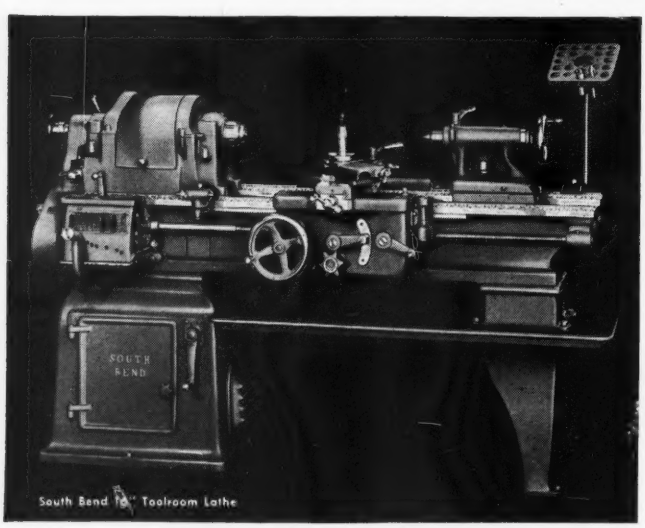
Center Rest and **Follower Rest** for supporting long bar work while turning, threading, drilling, boring, etc.



4-Way Turret Tool Block permits use of four cutting tools which simplifies tooling for repetitive operations.



Taper Attachment for accurate taper turning and boring. Quickly engaged. Graduated in both degrees and taper per foot.



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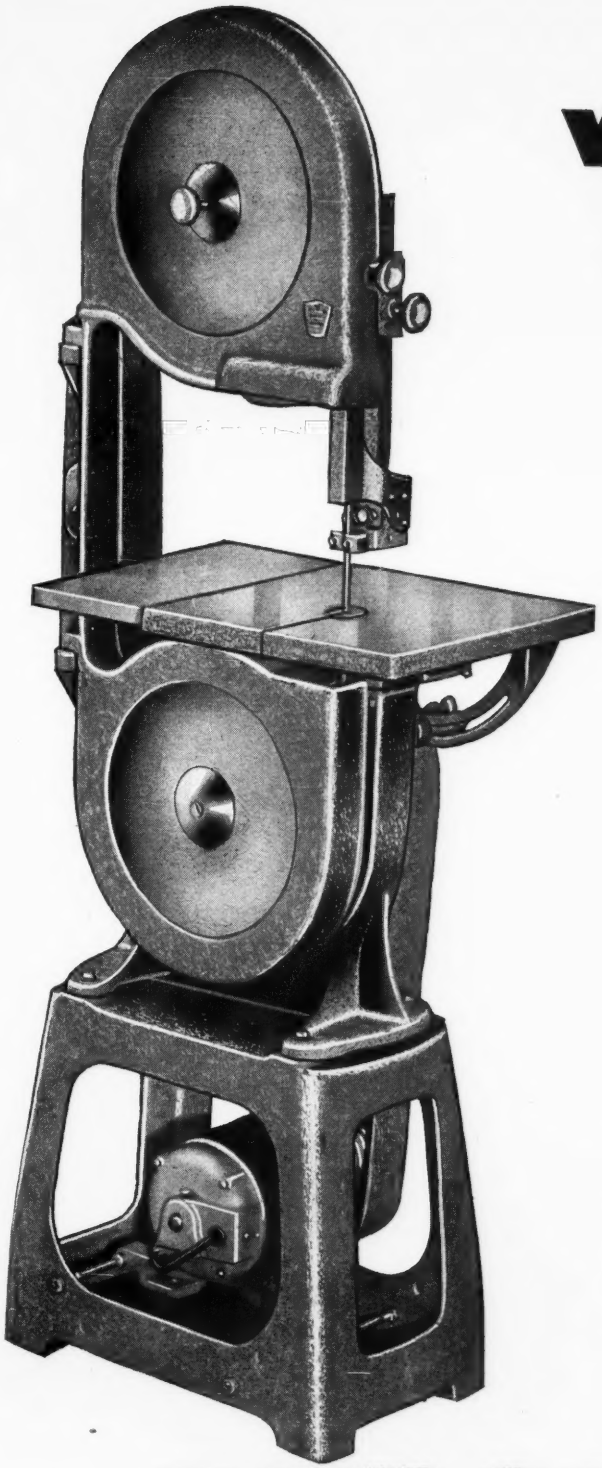

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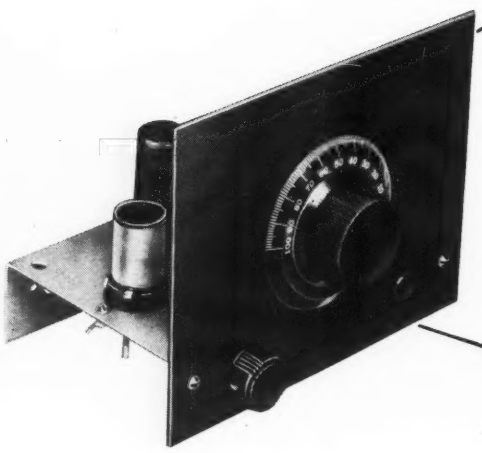

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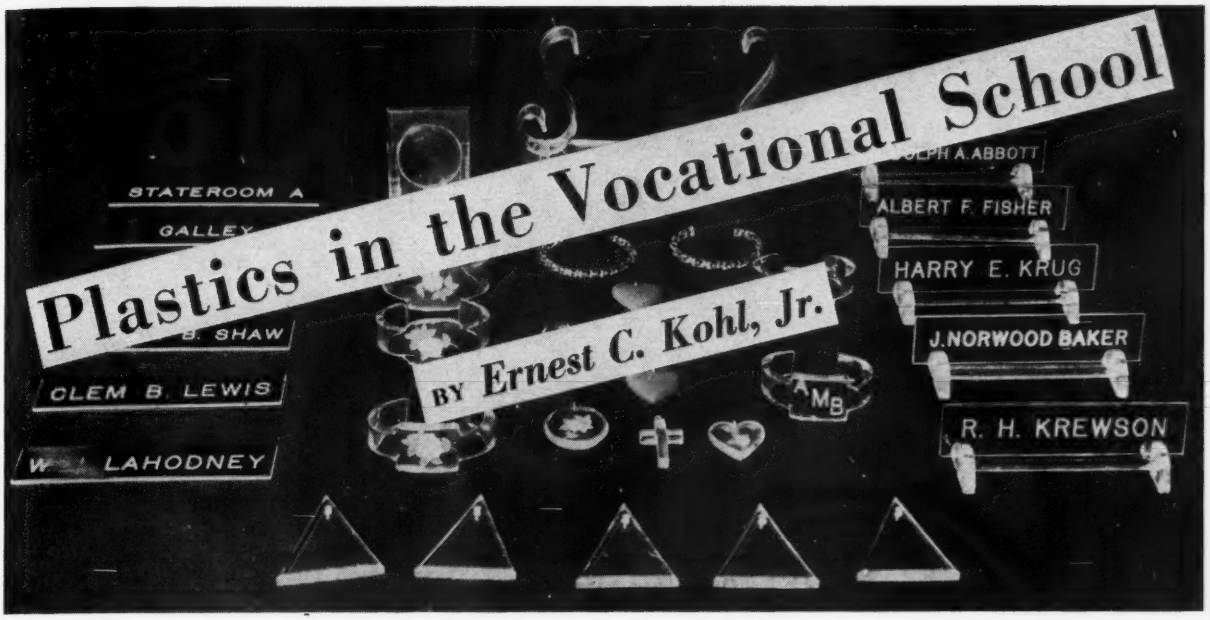


Plastics in the Vocational School

BY Ernest C. Kohl, Jr.

Here is a training program in plastics thoughtfully prepared to fill a real student need. The procedures might well be emulated by schools wishing to tread carefully in an area where much balderdash has been in evidence. Ernest C. Kohl, Jr., is Special Assistant to the Principal of the Edward Bok Vocational School, Philadelphia. The pictures are by William Ciriacy, instructor in plastics, and were developed in the commercial photography shop in the school.

THERE can be no doubt about the future of plastics. They are firmly established as essential materials in industry. It is proper that the school should give the student a basic knowledge of what plastics are, where they can be used, and how they may be handled. Accordingly, plastics have been accepted by the industrial-arts laboratory. Their study fits in with the accepted philosophy of industrial arts; but what of plastics in the vocational school?

Vocational education concerns itself with training specifically directed toward entrance into a trade. The question then arises, what is the plastics trade? Is it the production of plastic products or the mechanical service required for mold making or machine maintenance or that phase which includes the chemical production of plastic materials? Each field within itself presents a training problem of a highly specialized type, each at a different level—one repetitive, another skilled, one highly technical.

The production of plastic products involves press operation, machining, finishing, and inspecting of plastic products. Training for such operators probably should include the development of simple mechanical skills in addition to a basic knowledge of the mechanical and physical properties of plastics. Almost entirely repetitive in nature, this is probably the lowest level in the industry and can best be taught by actual making of the product.

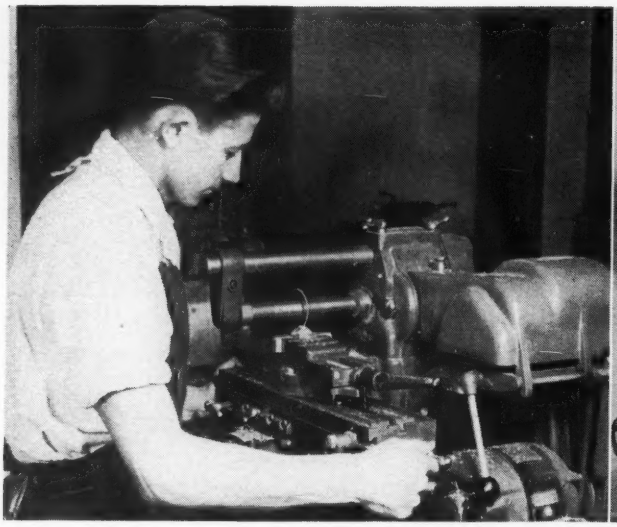
Mechanical services needed in the plastic industry include the design and manufacture of the molds, the setting of the molds in the automatic presses, and adjustment and maintenance of the machines during operation. Training for this division could readily be made a part of the vocational-school machine-construction program. Such work requires the skills, knowledge, and services of machinists and die makers. Recognizing this field as a division of the industry in which the greatest service might be rendered, the Edward Bok Vocational School in Philadelphia introduced a unit in plastics into the machine-construction curriculum. At the discretion of the coordinator, boys in advanced classes are assigned to the plastic shop for a period of 20 weeks, for 15 clock hours each week. To meet the requirements of this unit a shop was organized with the equipment listed below.

Stokes standard mold press—20-ton capacity with electrical controls to provide proper cycle of operations. Press is provided with suitable steam connections of sufficient pressure to produce 350° F. temperature. In addition to the steam heat on the plattens, electrical heating elements of cartridge type, thermostatically controlled, are provided for specific molds.

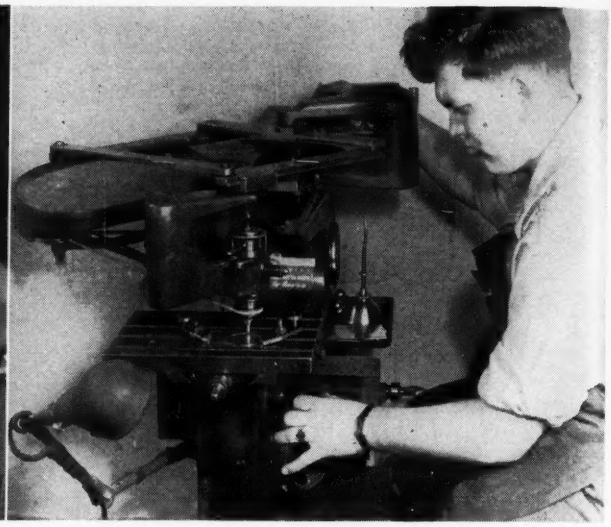
2 Carver laboratory presses, 6″ square, electrically heated plattens, 20,000 pounds capacity.
2 drying ovens, 4′ x 4′ x 6′ with shelves, maximum temperature 150°, to be used for preheating plastic powders; separate area provided in oven to heat Plexiglas to permit forming over blocks.
1 Walker-Turner metal cutting band saw, 14″—with special blades.
1 Gorton tool grinder.
2 buffing wheels, 12″ buffs.
1 Pries tool grinder.
2 Gorton 3U pantograph machines.
2 Pries engraving machines, type UEM.
3 Pries engraving machines, type UE.
2 Buffalo drill presses—bench models.
1 Canedy Ott drill press.
1 tool grinder (lathe tools).
4 lathes 9″ x 3′.
3 lathes, 13″.
1 shaper, 16″.
1 shaper, 7″ (bench).
1 milling machine—universal.
3 milling machines—bench type (Atlas).
1 Robertson Economy power hacksaw.
Suitable benches with 12 vises.
Storage area for plastic compounds and sheets.

Mold Making

Mold making, the major activity in this shop, presents an excellent means of developing in the pupils the need for accuracy. In the construction of molds, accuracy and finish are of paramount importance. Recognizing that the quality of the finished product depends on the degree of finish achieved in machining of the mold, considerable stress is laid on the importance of this phase of the work. The result of poor work in the mold is at once apparent on inspection of the finished plastic product. The majority of molds prepared in the shop



Milling bracelet blanks from Plexiglass.



Reducing a design on a Gorton pantograph machine.

have been circular in design and are readily produced on the lathe. They are of the "semipositive" type in which little if any "flash" results during production. The molds are usually made from mild machine steel which, when properly heat-treated, gives excellent service. Although tool steel exhibits less distortion during heat treatment as well as under molding pressure, it is difficult to machine and is used only for molds subject to considerable use. As the shop is interested primarily in training mold and die makers, the replacement of mild steel dies can readily be incorporated into the work of the class.

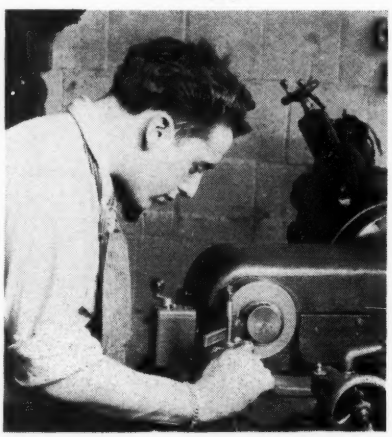
Additional machine training is provided in the preparation of the heating plattens for the presses. In working with these it has been found advisable to heat the mold by direct contact with plates heated by cored or drilled passages in which steam circulates. The plattens may be adapted for application of heat by means of cartridge heating units thermostatically controlled. However, steam heating has proved more effective.

Compression Molding

Compression molding with thermosetting compounds is accomplished in either the Carver Laboratory press or in the Stokes semi-automatic press. Accuracy in mold installation is essential. The two halves of the mold must be in perfect alignment to avoid an excessive parting line. After the mold has been fastened rigidly in the press, the reproduction of the plastic pieces becomes semi-automatic. Opening and closing of the mold is effected by the operation of the press. Molding powder is placed in one section of the mold after measurement in fixtures or graduates which hold the correct quantity of powder. The amount required is determined by experimentation. A hydraulic cylinder forces the movable member of the mold to compress the powder into the required shape. The combination of heat and pressure completes the chemical reaction while the molding material is held under pressure. At the completion of the cycle, the ejector pins, operated by pressure, discharge the finished piece and the cycle is repeated. Finishing of the individual pieces has been reduced to a minimum. When necessary, flash and burrs are removed by belt or disk sanding, hand filing, and buffing.

In addition to the machine work involved in the preparation of the molds, training is given in the operation of two types of pantograph engraving machines. This work includes the preparation of name plates and identification tags and the reproduction of designs as part of the mold construction. Instruction is given also in the proper grinding and adaptation of standard tools to the machining of cast and extruded shapes and sheet and laminated plastics.

Machining a die for one of the ashtrays shown on next page.



Chemistry of Plastics

In addition to the work given as a unit in the machine-construction program, offerings are made on the adult level. Recognizing that the manufacture of molding powder, the backbone of the plastic industry, involves complex chemical reactions on an industrial level, the school felt that only in a very superficial way would it be possible to give any training in this highly technical division of the industry. Chemistry of plastics, except for basic principles in related chemistry, is therefore offered in the adult evening school only. The adult program is designed for those interested in or employed in the field of plastics as mechanics, die makers, molders, fabricators, and users of plastic materials, rather than as an advanced course for chemists interested in the synthesis and processing of plastics. The course includes the basic theory and technology of all types of plastics. It is given independently rather than as an adjunct to any work done in the plastic machine shop. The work includes a comparable study of the characteristics and uses of thermoplastic, thermosetting and resinous materials, chemical-physical, and mechanical reactions of phenolic, urea, cellulose, acrylic, vinyl, styrene, protein, and amino plastics. A fully equipped laboratory with apparatus for conducting experiments in inorganic and organic chemistry is available. Small laboratory presses with standard type molds are

provided for mechanical-physical testing of batches of plastic molding powders.

The work of this class is supplemented by a lecture course planned to serve the needs of salesmen, industrial designers, purchasing agents, and others interested in the application and adaptation of plastics to industry. This class is entirely on the basis of lectures and is planned to meet the demands of the individual members registered in this activity. It includes some basic information concerning production, mold design, selection of proper plastic material, fabrication, and adaptation to industrial design.

Hobby Program

As an outgrowth of work in plastics within the school, a very active hobby program has been developed. The work in this class concerns itself with the making of plastic novelties such as earrings, brooches, bracelets, picture frames, cigarette boxes, candlesticks, etc. Many of the students enrolled in the courses described above utilize this section to develop their ideas in concrete form. The work in this section usually involves the use of sheet or extruded standard shapes of various plastic materials.

Suggested sources of molding materials are given below with the manufacturer's name following the trade name of the material:

Phenolic Molding Materials

Bakelite—Bakelite Corp., N. Y. City.
Durez—Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.
Heresite—Heresite & Chemical Co., Manitowoc, Wis.
Indue—Reilly Tar & Chemical Co., N. Y. City.
Makalot—Makalot Corp., Boston, Mass.
Textolite—General Electric Co., Pittsfield, Mass.

Urea or Amino Plastics

Beetle—American Cyanamid Co., N. Y. City.
Bakelite Urea—Bakelite Corp., N. Y. City.
Plaskon—Plaskon, Inc., Toledo, Ohio.

Acrylic Plastics

Crystalite—Rohm & Haas Co., Inc., Philadelphia, Pa.
Plexiglas—Rohm & Haas Co., Inc., Philadelphia, Pa.
Lucite—E. I. DuPont de Nemours & Co., Wilmington, Del.
Acryloid—Resinous Products & Chemical Co., Philadelphia, Pa.

Cellulose Acetate

Bakelite C. A.—Bakelite Corp., N. Y. City.
Lumarith—Celanese Celluloid Corp., N. Y. City.
Monsanto C. A.—Monsanto Chemical Co., Springfield, Mass.
Nixonite—Nixon Nitration Works, Nixon, N.J.
Plastacele—E. I. DuPont de Nemours & Co., Arlington, N. J.
Tenite—Tennessee Eastman Corp., Kingsport, Tenn.
Cellulose Acetate—Hercules Powder Co., Wilmington, Del.

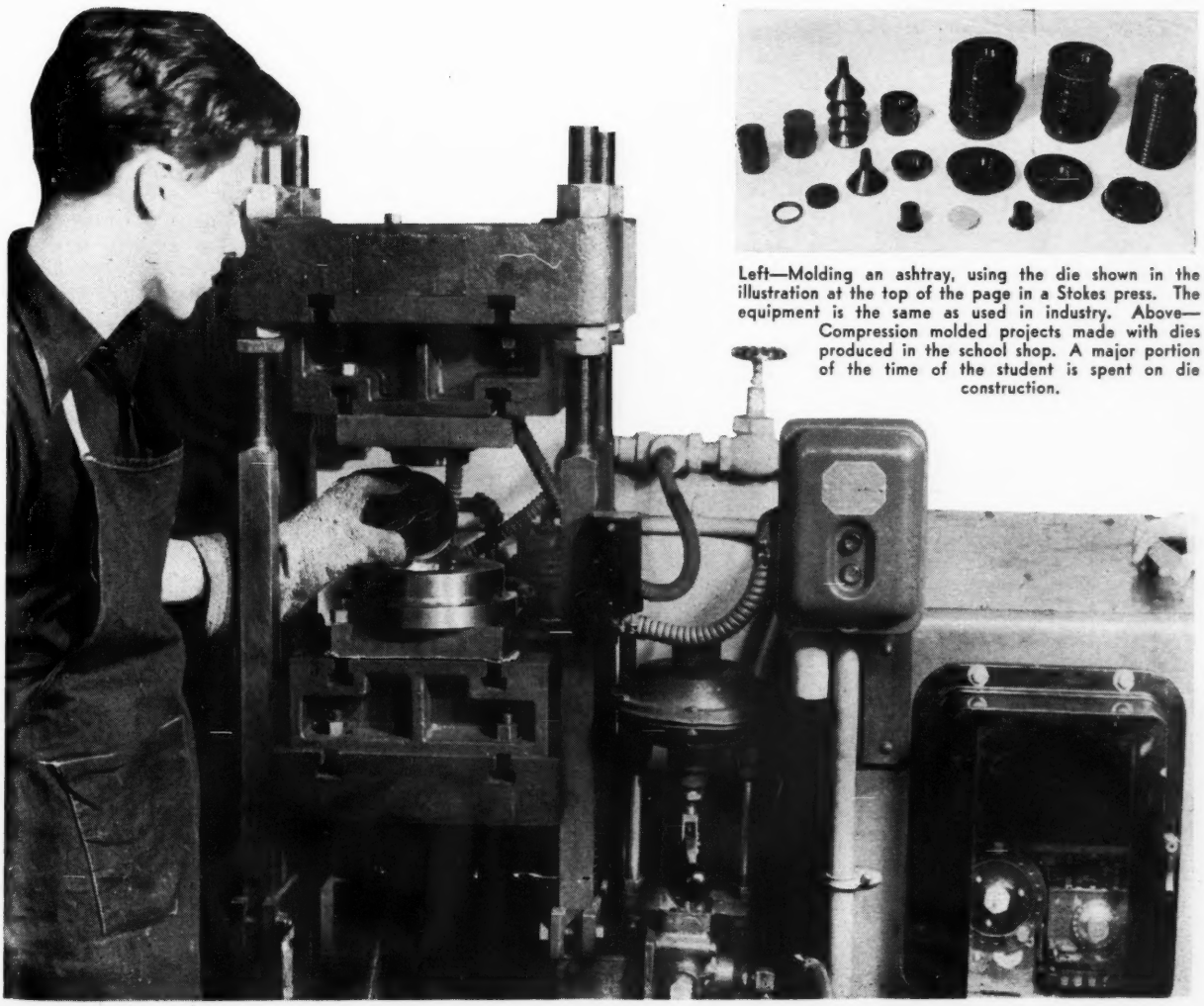
Cast Phenolic

Catalin—Catalin Corp., N.Y. City.
Gemstone—A. Kneedler Co., Lancaster, Pa.
Marblette—Marblette Corp.
Opalon—Monsanto Chemical Co., Springfield, Mass.

Laminated Plastics

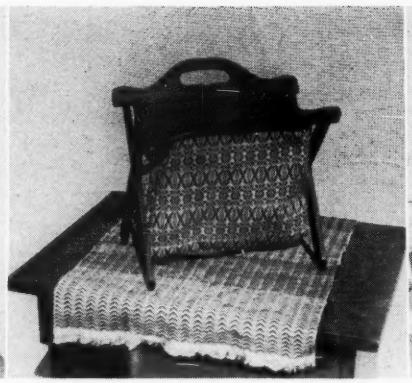
Formica—Formica Insulation Co., Cincinnati, Ohio.

(Continued on page 25)



Left—Molding an ashtray, using the die shown in the illustration at the top of the page in a Stokes press. The equipment is the same as used in industry. Above—Compression molded projects made with dies produced in the school shop. A major portion of the time of the student is spent on die construction.

Weaving on a table loom.



Textile articles made in school shops.

Weaving on a frame loom.

Introducing Textiles in the School Shop

BY *Arthur F. Ahr*

Teachers of industrial arts are expanding their course offerings to include other areas than the traditional wood and metal-working. Textiles is a field which has much to commend it educationally. Arthur F. Ahr, Supervisor of Industrial Arts, New York State Education Department, here discusses this fundamental craft.

WEAVING, dyeing, and block printing were accomplished arts long before the advent of writing, and we owe much of our knowledge of early history to the designs woven into and printed upon the fabrics of the time. Therefore it would seem that weaving, as one of the oldest and most fundamental crafts, deserves a place in our industrial-arts shops along with more recent industrial activities such as woodwork, metalwork, and electricity.

The field of textiles is broad and takes in many phases of our industrial, commercial, economic, and social life. In industrial arts we may study textiles as a commodity, as an industry, and as an avocation. Its study possesses the following educational values:

1. Affords pupils an opportunity to understand handicrafts past and present as a part of our inherited culture.
2. Provides a medium for creative expression.
3. Presents an opportunity for the study of color harmony in a functional manner or medium of expression.
4. Paves the way for future avocational interests.
5. Supplies an opportunity for exploratory experience in an interesting industrial activity or area of work.
6. Furnishes a medium through which an understanding of the problems of industry and its workers may be developed.
7. Gives the pupils an opportunity to learn how to choose, make, use, and care for textile products.

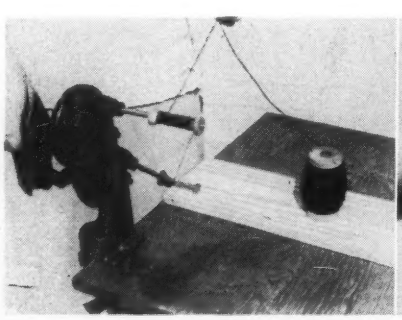
To get and hold the interest of the pupils in textile work requires the installation of weaving machines that actually work. Every industrial-arts shop should have at least one loom that presents a real challenge to operate successfully and, above all, one on which a worthwhile and usable product can be made. If space and funds permit, the inclusion of several types is advisable. They can be purchased in a variety of sizes and styles or designed and made to suit the needs of the individual situation.

The task of scheduling or fitting textiles into an industrial-arts program presents problems that do not arise in most other areas of work. As a loom is available to only one pupil during the time he or she is working on a particular article, it is necessary to give careful consideration to the choice of projects and to the pupil's willingness to work hard to complete the job.

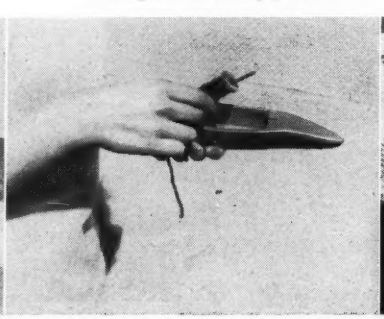
It is possible to turn out a rag rug in two or three hours and a woolen neck scarf in from six to ten hours on a table or floor loom. By careful scheduling and by allowing pupils to work during study periods and after school, much can be accomplished on a few looms.

Weaving on a table or floor loom is not the main objective in textile work. It is merely one of the high spots for

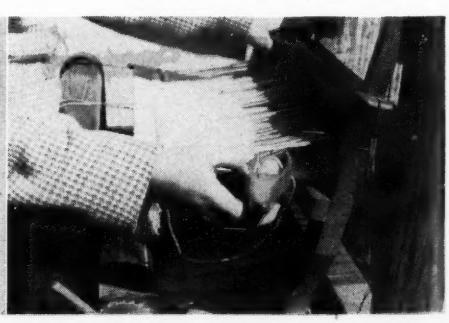
Winding a bobbin.

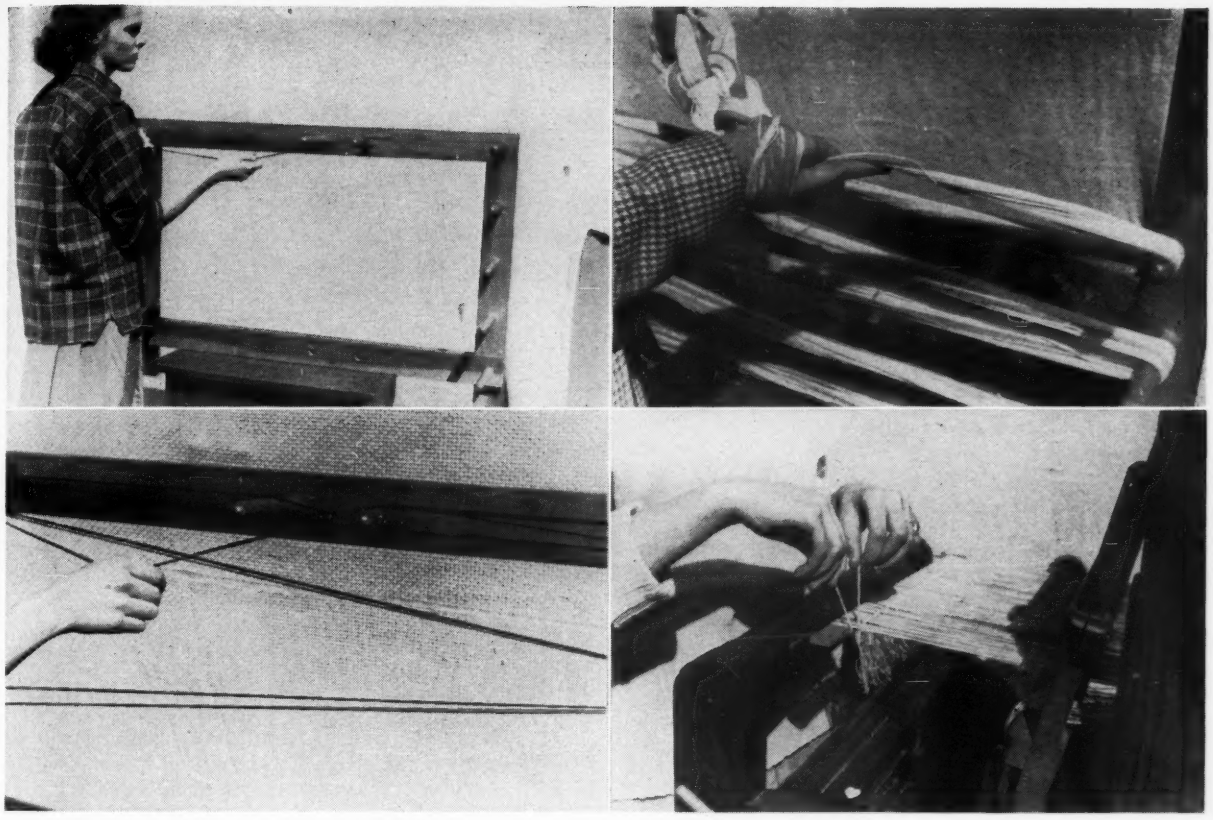


Placing a bobbin in the shuttle during the threading process.



Throwing a shuttle through the shed on a four-harness table loom.





Above—Starting a warp on a warp board.
Below—Forming the weaver's cross while making a warp on a warp board.

Above—Making a warp chain.
Below—Tying on a warp.

most pupils. Many other activities are carried on by each class member. The following have proved very adaptable for use in a comprehensive general-shop program:

Carding and spinning.
Dyeing.
Printing.
Simple frame weaving.
Waffle weaving.
Egyptian card weaving.
Hooking rugs.
Knitting with knitting devices.
Belt weaving on inkle looms.

Weaving on two- and four-harness table and floor looms. Articles such as book markers, belts, table mats, rag rugs, scarfs, chenille rugs, hooked rugs, table runners, handbags, table linen, footstool covers, and pillow tops can be successfully made in a school shop.

In conjunction with the above activities, pupils should have an opportunity to study textile fibers, design patterns for fabric, choose color combinations, make pattern drafts, and make a warp for some form of loom from a pattern draft. They should also be taught how to test, select, use, and care for textile products.

Textiles can be effectively combined with other areas of work in the comprehensive general shop. An example of a combination product is a footstool in which the pupil makes and finishes the wooden frame, weaves the fabric for the cover, and upholsters the stool with the woven fabric.

The equipment listed below will be sufficient to teach textiles effectively as an activity or area of work in a comprehensive general shop where the average class registration does not exceed 25 pupils per period.

Not all of the pupils will be able to weave at the same time, but they will all have an opportunity to observe textile work being done, and they will all have an opportunity to do one piece on a table or floor loom and make several other articles using the smaller equipment.

1—42″ four-harness floor loom
2—24″ four-harness table looms
2—18″ four-harness table looms
2—inkle looms
4—box looms
20—frame looms
20—sets of Egyptian weaving cards
1—bobbin winder
1—warp board
1—table-type swift
6—12″ flat wood shuttles
6—18″ flat wood shuttles
6—24″ flat wood shuttles
8—12″ Swedish type shuttles
2—reed hooks

In order to meet effectively the needs of classes when starting a unit of textile work in an industrial-arts shop, a small quantity of the following materials should be in stock: cotton rug warp in a variety of colors, rug filler and chenille in several of the most commonly used colors, thin cotton warp and mercerized cotton in several sizes and colors, twisted wool warp in a few sizes and colors, and small quantities of yarn in a variety of sizes and colors.

Experience has shown that the study of textiles in a comprehensive general shop is very gratifying. The pupils are intensely interested and proud of their accomplishments. Parents and friends often ask permission to come and watch the work being done. Textiles as a shop activity embodies a profound justification of the aims of industrial arts.

The books listed below contain much helpful information concerning the various phases of textile work. Every industrial-arts teacher who is teaching or who anticipates teaching textiles should review them and select those

(Continued on page 25)

Films for Shop Training

Part III—This Is How It's Done

BY *Floyde E. Brooker*

Teachers seriously interested in vitalizing their instruction through the use of visual aids will find technics for doing so discussed in detail in this, the final installment of the series on "Films for Shop Training," prepared by Floyde E. Brooker, Director, Visual Education, U. S. Office of Education.

SHOP teachers, if they are really interested in using films with the greatest degree of effectiveness, will keep in mind (1) that these suggestions are guiding principles for self-training rather than hard-and-fast rules or commandments and (2) that every general suggestion will require modification and adaptation to fit the individual class.

The Role of Films in Training

There is one major difficulty inherent in all shop courses. Shop training tends to divide itself into two phases: (1) instruction which the teacher gives students individually on the machines and (2) related information which can be given simultaneously to the whole class. From this major difficulty there stem others of more immediate importance to the instructor, such as the problem of keeping the class together for the "related information" and at the same time allowing the individual students to scatter out to work on different jobs and different machines according to their individual progress. If the teacher tries to keep the whole class together in order to provide the most effective instruction in related information, he may find that the progress of certain students in the use of a specific machine is unnecessarily retarded. If, on the other hand, the students are permitted to go about their work on individual machines, the instructor may find himself delivering individual lectures on related information. Such a procedure is not only tiring for the teacher but is also inefficient for the class as a whole.

Naturally, this is an oversimplification of the problem. Any shop instructor can add to this analysis such other factors as (1) the need to achieve maximum value from both equipment and time spent, (2) the size of the usual classes handled in the shop, and (3) whether the class is elementary or advanced, etc.

Instruction for One or All

Perhaps films, by providing a tool which is useful in both group and individual instruction, can help in solving this problem. Here are a number of ways in which this may work out:

1. When a student gets ready for a new machine or a new workpiece, why shouldn't he see the film once or twice, study it, check through the filmstrip, and then come back and try the job on the machine? Then the instructor, instead of having to take time from the whole class to demonstrate the machine to a single student, will be required only to check through the things which the trainee hasn't understood from the film showing. Such use of the film will be particularly effective if on a given machine, for example the lathe, the job pieces set up in class are the same as those used in the lathe films of the U.S. Office of Education.

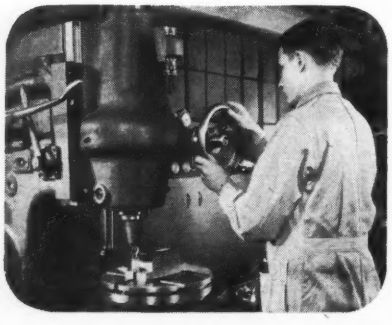
2. Is there any reason why the film demonstration should not carry the bulk of the work of all group as well as individual demonstrations? The average group demonstration is woefully inadequate—only a few of the students are able to see what the instructor is doing; extraneous noises frequently interrupt the proceedings; and some group time is often lost while someone looks for tools. Of course, in actual practice the machines used in class will differ from those shown in the film and the instructor will have to give a group demonstration to adapt the film to the classwork. But such a demonstration can be built on a thorough understanding of the film.

3. Films could be used for teaching much of the related information now given through lectures. The use of films in such a case makes it possible for each student to get his explanation of a job just when he needs it, i.e., just before he begins to work on a particular operation. Very few classes have enough milling machines so that every member of the group can go from a lecture or explanation of the dividing head directly to working with one; yet no lecture concerning the operation will be very effective if part of the class will not work with a dividing head for from two to six weeks after the explanation. Nor can the usual methods of explanation excel or surpass those in the Office of Education film entitled "Cutting a Spur Gear Using a Dividing Head." So when the student gets ready to use a dividing head on a milling machine, why shouldn't he be shown the film—either for the purpose of getting his explanation or of having a previous explanation of the work refreshed for him?

Such use of films will permit a greater proportion of the instructor's time to be devoted to individual instruction, as well as allowing an even greater amount of spreading out on the part of the class. Thus particularly apt pupils will be given an opportunity to advance at even greater speed and try a greater number of more difficult tasks in the same time.

4. A favorite standby of the die-hard vocational instructor contemplating the use of films is "students learn by doing." Nothing could be truer, and nothing in this article should be construed as deny-

View from film on milling. Instructor demonstrations can be minimized through students using films.



Every student can see a projected demonstration. All details are visible to each class member.

War-Proved Aids for Better Shop Teaching

HUNDREDS of skill-training motion pictures are now available as valuable teaching aids to school shop instructors. Produced under the sponsorship of the U. S. Office of Education, these films have *proved* their effectiveness by speeding the training of millions of warworkers. They can do as outstanding a job in *your* service.

You can rent or buy any of these films from the B&H Filmosound Library. Rental rates are moderate, and are rebated if the films are bought within thirty days. Send the coupon for an illustrated catalog containing descriptions which make film selection easy and sure.

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ing that basic fact. Nevertheless, before a student is ready to "do" there are many things he must be taught, such as: (1) the names of the parts of the machine; (2) the principles of speed and feed; (3) the importance and meaning of tolerance; (4) the proper "feeling" toward the machine and the job. Most important of all, the student must have a chance to see someone who is skilled in the operation actually doing it. Readying the student to start doing a job is one of the greatest contributions films can make to shop training.

Vocational education does not seem to have differentiated between the varying proportions of physical and nonphysical "learning" that are required for various skill jobs. In the operation of a lathe, for instance, the greatest part of the training job is developing the nonphysical aspects—that is, the facts, attitudes, and understandings as well as the judgment relative to the application of them. We believe, on the basis of our experience over the past four years, that films are particularly effective in teaching skills requiring more nonphysical than physical training.

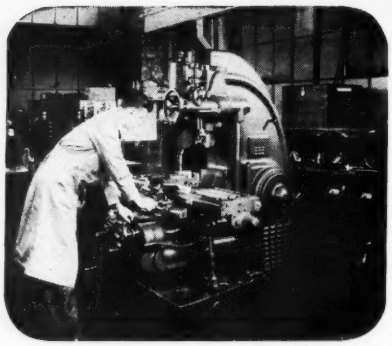
On Your Mark

Locating film sources.—The first step in using films, once the instructor has determined to give them a try, is to locate films that are likely to fit his class work. If the school system of which the shop is a part has a visual-aids division, it will be able to provide the instructor with lists of available films. If the school system has no such division, then the individual shop instructor will have to begin by locating his own sources. Some place in every school system there should be a central depository of film catalogs; if there is not, then the instructor will find himself forming one. In locating films, always try to locate them as near home as possible because this makes for more inexpensive postage or express charges and quicker delivery service. In order, the following are suggestions for locating sources of films:

1. Check with the state department of education and the state university extension division for their film catalogs.

2. Check with local dealers of visual-aids equipment for the catalogs of films that might be available through them.

There also are films produced by national and local business concerns that many instructors have found useful in shop training. Whether or not these sources are checked will depend on local educational policies regarding the use of sponsored films.



Courtesy Castle Films

Films can be timed to give students information just when they need it—as they are about to begin a job.

Some time in the search for film catalogs a library of them should be acquired which should include the following:

The U.S. Office of Education catalog of vocational films, Washington 25, D.C.

The Educational Film Catalog, H. W. Wilson Company, 950 University Ave., New York, N.Y.

The film catalog issued by *Educational Screen*, 64 E. Lake St., Chicago, Ill.

The film catalogs listed by individual commercial distributors.

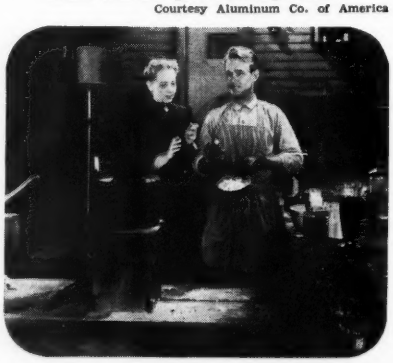
Selecting films—There are lists of "evaluated" films which have considerable value for the instructor just starting to use films. Generally, however, few of these lists include many of the more recent shop films.

At first the instructor probably will have to depend on the title of the film and the catalog description. With many recent films these are a reliable guide to the content of the film. This is not always true because such titles as "Every Minute Counts" will not tell you anything about the content although a good catalog listing will give considerable information.

On the basis of the available information, select those films that seem: (1) to fit best into the classwork in terms of the training purposes to be served, the area of subject matter to be covered, and the advanced or elementary nature of the classwork; (2) to offer the greatest assistance in those areas of instruction where the difficulties of instruction are greatest; and (3) to offer the greatest value in terms of the budget available for film rentals and film purchases. It should be noted here that if a school is purchasing films, additional factors should be considered.

Related information, such as contained in this film on the story of the production of aluminum, can be given through films.

Courtesy Aluminum Co. of America



Get Set

Order the film.—Unfortunately, the film probably will have to be ordered some time in advance of the date on which it is to be used. This is one of the undesirable aspects of the "pioneering" period and makes it difficult to use films at the most advantageous time for instructional purposes. It is also an argument favoring purchase of some of the more frequently used films.

Preview the film.—When the film arrives, look at it. No catalog description can do justice to a motion-picture presentation. Such notes as the following should be made on the content of the film in order to use it most effectively in training:

1. What are the chief points really "put over" by the film? These are the points the instructor should indicate to the class before showing the film. Certainly some preparation for seeing the film should be given the class; otherwise it tends to become a "show." People see what they look for.

2. The ways in which the film presentation needs adaptation to the training work of the group. Does the machine used differ materially from those in your shop? Have you followed some slightly different methods or procedures in doing the job? These are the things you will need to stress with the class in order to adapt the film to its needs.

3. The things in the film which you wish were different. Films have to be made for general use. Usually producers have a keen sense of their responsibility, but even so there may be things in the film that you think would be better if they were different. List these things for special emphasis with the group. Remember we do not throw away a whole plank because there is a knot in it. We cut out the knot and use the rest.

4. Some place in your records keep a copy of your over-all judgment of the film. You may want to start this judgment now and complete it later after you have used it. But make certain that some such record is kept in order that

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VICTOR has served long and well; VICTOR wants to come home to again serve Schools, Churches, Industries and the home user.

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other instructors won't have to order the same film next semester or next year with as little advance knowledge as you had.

5. Make a rather thoughtful list of the ways the films could be used to serve differing educational objectives. For example, the same film might be repeated several times to the same class for slightly different purposes such as: (*a*) to develop an understanding of the basic principles demonstrated; (*b*) to get a clear idea of the sequence of operations and the reasons for that particular sequence; (*c*) to develop the vocabulary required for the operation on that particular machine; or (*d*) to emphasize the safety angles of that particular job. This list will differ from film to film. This list assumes a job-demonstration type of training film.

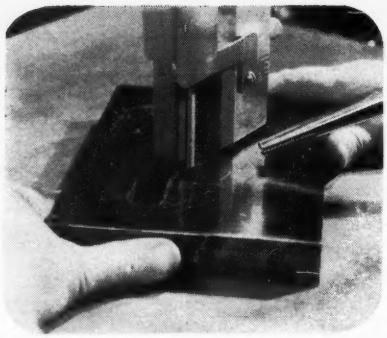
6. Decide where the film fits in your own class instruction. Will it take a part of the load of some machine demonstration? Maybe it will serve best as related information. Perhaps it could be an excellent basis for orientation or summary or test. The film showing is going to take some class time and such class time is not justified unless the film showing actually does a particular instructional job better than any other possible use of that time. It is obviously better that this supplanting or substituting be intelligent rather than at random.

You will undoubtedly make mistakes on some of the foregoing six points. This is inevitable and by practice, trying, then checking, these things will come easily. No one at this stage of the game knows all the answers; the instructor who uses the films will have to find most of them for himself.

Go!

Showing the film.—Projection—a book could be and has been written on this subject. Suffice it to say here that even with buildings not constructed with the idea of film use, the problems involved are not insurmountable. Give to the projection of a motion picture the same care you would give to a shop demonstration you might wish to stage. Have the projector hooked up ready to go, the room darkened and a suitable screen in place. A demonstration of a job can lose all its educational effectiveness if the instructor, as he starts the demonstration, has to look for his tool bits, his wrenches, his file, his workpiece. The same principle holds for the projector and its use.

Preparation of the class is important.



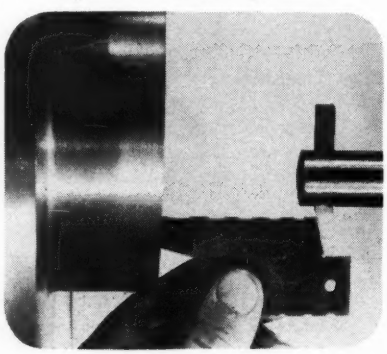
Instructors help students to learn by pointing out what to look for in films.

People tend to see what they are looking for. It is at this point that the notes taken during the preview by the instructor are excellent because they provide the material necessary to prepare the class for seeing the things the instructor wishes them to see.

Showing the film requires a technic in itself. Probably the first showing of the film should be uninterrupted from beginning to end. There are other types of showings, however, such as: (1) running the whole film silently with the instructor providing the running explanation; (2) running only those portions of the film which seem to have been understood least and require additional explanation, etc. There are other ways that may prove desirable in individual situations.

Again it must be stressed that the teacher needs to experiment, try, check and try again to discover the most effective ways in his own situation. For example, will students absorb the vocabulary naturally and inevitably as a part of the total presentation or will a special showing concentrating on vocabulary prove desirable? Selfidentification is "built in" most of the Office of Education shop films, but how do you use a film in order to get the most out of this feature? Would it be desirable to show the same picture four or five times, each time concentrating on a different aspect of the demonstration? If so, what should be the time between these showings?

Films are excellent for teaching the vocabulary required for various operations.



Follow-up after the showing must be done. Do the students know, or have the students learned what the film taught? Perhaps the best check or test is to have the class or individual go at once to a machine and try to do the same job. Certainly this is the best way to do the best possible job of checking. Perhaps there should be a discussion following the film covering such points as these: (1) the points where the film material needs to be adapted to local conditions; (2) the procedures followed in the film, the basic principles explained, the operations used; (3) the points which the group did not seem to understand; and (4) questions of students.

It is very difficult to generalize regarding the follow-up of film showings, since there are so many variables that affect this part of the instruction. The points given above, for example, are all right for a job-demonstration film, but they would differ considerably if the film were one of orientation or basic principles or nomenclature. The points given above assume also that the film is to be used as a demonstration. They would vary a great deal if the film were to be used for orientation to the machine or as a summary for a period of study or as a basis for a test. Indeed, they might differ more than the average instructor thinks from film to film and from class to class.

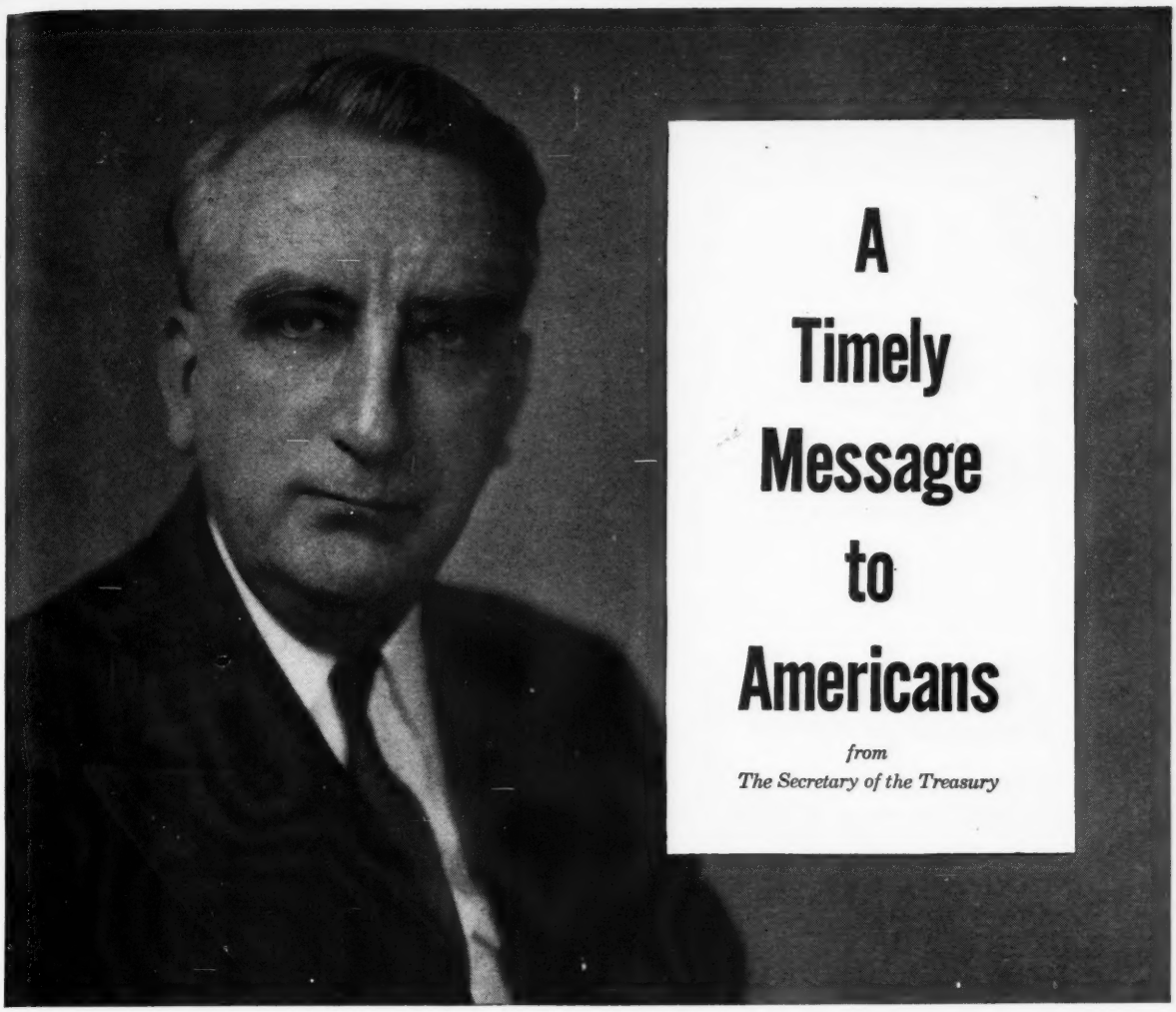
Additional points and considerations.—By the time the instructor has reached this point in his reading, the inadequacies of the general type of discussion in this article should have become clear. Generalized statements cannot take proper account of individual cases and, in a sense, every use of a film is an individual case.

Nor has this account taken any note of the availability and use of instructor's manuals that oftentimes accompany films, nor of filmstrips that in the case of the U.S. Office of Education productions are made for use with the film.

Where a filmstrip is available some over-all uses might be suggested as follows:

1. It is seldom desirable to try to use the entire filmstrip. It was not designed for such use and would probably take too much time.

2. Selected frames of the filmstrip might be used either before or after the showing of the motion picture as a part, respectively, of the class preparation or follow-up. *(Continued on page 40)*



A Timely Message to Americans

from
The Secretary of the Treasury

America has much to be thankful for.

Abroad we have overcome enemies whose strength not long ago sent a shudder of fear throughout the world.

At home we have checked an enemy that would have impaired our economy and our American way of life. That enemy was inflation—runaway prices.

The credit for this achievement, like the credit for military victory, belongs to the people.

You—the individual American citizen—have kept our economy strong in the face of the greatest inflationary threat this nation ever faced.

You did it by simple, everyday acts of good citizenship.

You put, on the average, nearly one-fourth of your income into War Bonds and other savings. The 85,000,000 owners of War Bonds not only helped pay the costs of war, but also contributed greatly to a stable, prosperous postwar nation.

You, the individual American citizen, also helped by cooperation with rationing, price and wage controls, by exercising restraint in your buying and by accepting high wartime taxes.

All those things relieved the pressure on prices.

THE TASK AHEAD

We now set our faces toward this future: a prosperous, stable postwar America—an America with jobs and an opportunity for all.

To achieve this we must steer a firm course between an inflationary price rise such as followed World War I and a deflation that might mean prolonged unemployment. Prices rose more sharply after the last war than they did during the conflict and paved the way for the depression that followed—a depression which meant unemployment, business failures and farm foreclosures for many.

Today *you* can help steer our course toward a prosperous America:

—by buying all the Victory Bonds you can afford *and by holding on to the War Bonds you now have*

—by cooperating with such price, rationing and other controls as may be necessary for a while longer

—by continuing to exercise patience and good sense with high faith in our future.

The challenge to America of switching from war to peace with a minimum of clashing gears is a big one.

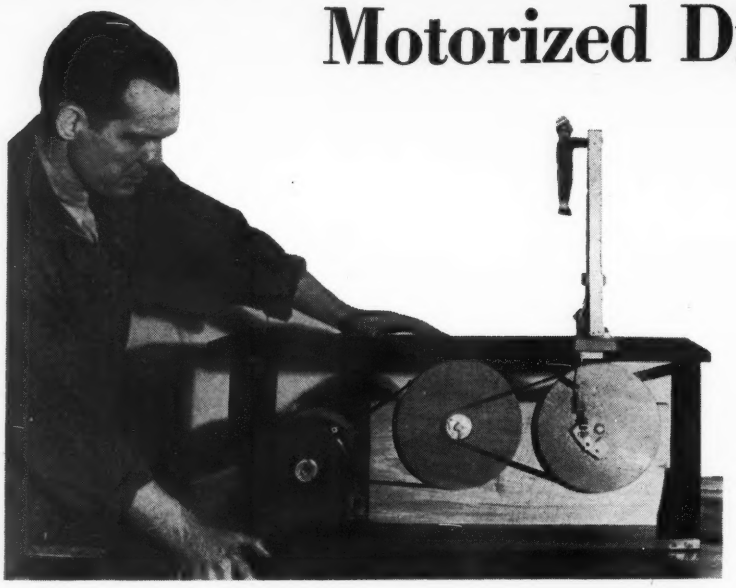
But it is a small one compared to the tasks this nation has accomplished since Sunday, December 7, 1941.

Fred M. Vinson
Secretary of the Treasury

A Government message prepared by the War Advertising Council and contributed by this magazine in cooperation with the Magazine Publishers of America.

Motorized Display Feature

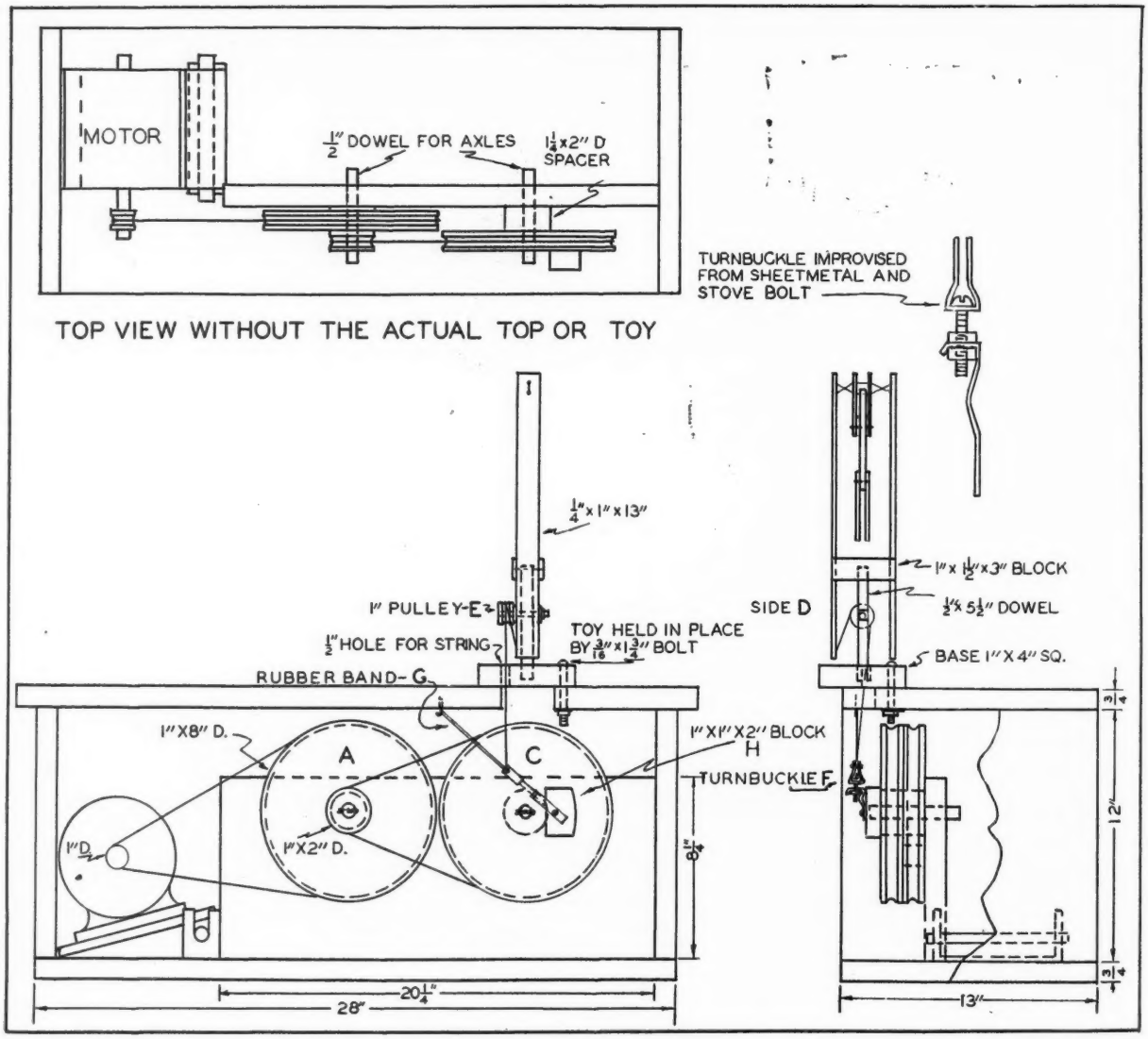
BY *Conrad Johnson*



Interpretation of the objectives and accomplishments of industrial education to the public is extremely important. This device adds animation to the usual static display of projects. Conrad Johnson teaches in the Mt. Hebron Junior High School, Montclair, N.J.

TESTED INSTRUCTIONAL PROJECT

EXHIBITS and displays are much more interesting when an animated set-up of some kind is used. The one described here was used recently in a shopwork display and was very successful. The toy acrobat is an "old-timer," of course, but the set-up, although admittedly very simple, is as



fascinating as ever. Moreover, the project involves many tool procedures and mechanical principles which afford definite learning opportunities for young workers.

Shopwork displays are excellent for good public relations. Static exhibits have value, of course, but the addition of animation increases interest manyfold. Incidentally, shop teachers miss a good bet with public displays if they don't have a placard on each exhibit explaining what the student learns when he makes the project exhibited.

Our recent display included many toys made by fifth graders, so it was decided to use one as the "animated feature." The toy was rigged up using an available motor and various pieces of wood, belting, bolts, etc., which are usually found in the school shop.

The motor was an ordinary 1750 RPM, ¼ H.P. The problem of regulating the speed so as to provide the power for this toy at the right intervals was readily accomplished by a series of pulleys. A 1″-diameter pulley on the motor driving on 8″-diameter pulley *A* brought the speed down to about 219 RPM. Pulley *B* is of 2″ diameter, fastened to pulley *A*. Pulley *B* drives pulley *C*, thus reducing the RPM to about 55. At this speed the toy is activated at about the same rate that it would be operated by hand.

This combination of pulleys affords an excellent opportunity to explain and demonstrate the theory of pulleys and gears for the benefit of young pupils. This method can be compared and contrasted with other speed-regulating devices such as found on the drill press, lathe, grinder, jigsaw, etc.

A ½″-diameter rod was bolted to the base of the motor and placed in a slotted piece of bandiron to form a "floating motor" arrangement.

The pulleys were cut from ¾″ stock and a ¼″ groove turned in the rim of each to take a ¼″ sewing-machine belt. Lengths of ½″-diameter dowel served as axles for the pulleys.

The toy was set up so that just one side (*D*) had to be moved to activate it. A string was fastened to the lower end of *D*, taken over 1″ pulley *E*, and then vertically down to turnbuckle *F*. The turnbuckle was improvised from two pieces of sheetmetal, a 3/16″ x 1″ stove bolt, and two nuts. The lower nut was soldered to the lower half of the buckle; the upper nut serves as a lock-nut after the proper tension has been attained. The turnbuckle was pivoted to block *H* with a 3″ No. 7 round-head woodscrew. Block *H* provides the necessary clearance between the end of the pulley axle and the turnbuckle.

A rubberband (*G*) was employed to take up the slack in the string which occurred except when pulley *C* was in its "pulling" position.

A piece of crepe paper was tacked on to dress up the rough box. To add to the novelty, a glove was stuffed with cloth and stitched on to *D*, thereby creating the effect of a hand actually operating the toy. The glove also helped to disguise the mechanism by concealing the pulley *E*, the string, and the hole in the base of the toy through which the string passes.

AVA Convention Is Postponed

Lack of hotel facilities has caused the postponement of the American Vocational Association Convention from December until a later date, probably the first week in February, according to Executive Secretary L. H. Dennis. Announcement of the convention city will be made later.

THE BOICE-CRANE BAND SAW
like all Boice-Crane Power Tools, is just the right size for school shops.
Cuts metal, wood, plastic and fibre stock up to 8⅝" thick and 27" in diameter.
Strong, light wheels effect exceptionally quiet, vibrationless operation.
Wheel guard swings on hinges and must be closed before machine can be operated.
Telescoping blade guard holds by friction when lock handle is released. It will not drop while adjusting.
The new blade guide design handles blades from ⅛" to 1" and is conveniently adjustable by single knob control.
The 15" x 15½" table is rigidly supported on two large trunnions. No portion can sag under heavy cuts. Tilts 45° to right, 10° to left, degree of tilt indicated by convenient scale.
8 efficient speeds, one for every kind of blade and material.
Heavy duty gears transmit as much as one horsepower at lowest speed with a wide margin of safety. All gears run in oil.
On floor model all moving parts, including motor, are fully enclosed and sealed against dust and grime. Given top rating by State Safety Commissions.
Also available in bench model.
Write for free catalog
BOICE-CRANE COMPANY
938 Central Avenue
Toledo 6, Ohio

Strictly Personal

ABOUT YOUR FELLOW TEACHERS

R. J. COLTHARP of Collegeboro, Ga., has been appointed associate professor of industrial education at Memphis State College, Memphis, Tenn. . . . H. F. RUSCH has retired as director of industrial education of the Oklahoma City, Okla., schools after serving for 40 years. His successor is EDGAR J. SPADY. . . . A. A. VEZZANI has returned to his teaching position in the Pontiac, Mich., High School after serving as industrial teacher-trainer at the University of Michigan. . . . KENYON FLETCHER, director of operations for the Illinois State Board of Vocational Education, has been appointed head of the newly organized vocational department of D. C. Heath and Co., publishers of Boston, Mass. . . . E. L. MEADER, formerly supervisor of supplementary training in the war-production training program in Wichita, Kansas, is now assistant director and coordinator of industrial, adult, and veteran education in that city. . . . G. WESLEY KETCHAM of the Norwalk, Conn., High School has been named supervisor of industrial arts in the Bureau of Youth Services, State Department of Education, Hartford, Conn. . . . KARL K. NELSON, instructor in industrial arts and director of the evening program, Newton, Kans., public schools, died recently. . . . LOWELL WELSH, superintendent of schools at Nebraska City, Neb., has been appointed director of the State Trade School, Milford, Neb. . . . MURRAY WADE has been named building-trades instructor at Evanston, Ill., Township High School. . . . New members of the faculty of the industrial-education department of the Ashtabula, Ohio, High School are ARTHUR WALD and MICHAEL PATRONE. . . . Three new teachers in the Billings, Mont., High School are CLAUDE LEAR, woodshop; REX IRELAND, farm shop; and L. CAMPBELL, auto shop. . . . NEAL MILES has been appointed woodshop teacher in the Ellison Junior High School, Wenatchee, Wash. . . . CLYDE HAMRICK, industrial-arts teacher in the Crystal City, Mo., schools, has been named superintendent of the Jefferson County, Mo., schools. . . . CHARLES S. HUEY has retired from the industrial-education staff of the Calipatria, Calif., schools and has been succeeded by EARL GARINGER. . . . DAMON K. KROH of the Millbrook, N. Y., schools has been appointed instructor in industrial arts at the Oneonta, N. Y., State Teachers College. . . . WILDON OWENS of Kenosha, Wis., has been named director of vocational education at Ashland, Wis. . . . . GEORGE EASTERMAN of the Norwich Regional Technical School, Norwich, Conn., has joined the staff of the Oliver Wolcott Technical School, Torrington, Conn. . . . CHARLES ROWE, Merrill, Wis., has been named director of the Rhinelander, Wis., School for Vocational and Adult Education, succeeding RALPH J. KEEN. . . . FRANK YOUNG has retired from his position as teacher of machine shop at the Chaffey Union High School, Ontario, Calif. . . . WALLACE K. HART has been appointed industrial-arts instructor in the Rangeley, Maine, High School, succeeding RALPH L. NORTON who was killed in military action. . . . DEWEY F. BARICH has returned to his position as head of the industrial-arts department of Kent State University after serving with the Navy in the Pacific. . . . ALBERT H. BROWN, former teacher in the Mexico, Maine, High School, is now teaching in the Stephens High School, Rumford, Maine.

Sheldon
VOCATIONAL
EQUIPMENT
Sheldon Equipment for the School Shop has, in the past, set the standard for comparison. As we face the demands of a postwar era . . . an era which calls for greater progress and achievements . . . Sheldon planned equipment and Sheldon planned shops will continue to offer the maximum in utility and dependability.
What Sheldon Planning Engineers have accomplished for others is a dependable index of what can be done for you. Acquaint us with your shop needs and your planning problems . . . Sheldon Planning Engineers will be happy to work with you.
LABORATORY AND VOCATIONAL Furniture
E. H. SHELDON & COMPANY
MUSKEGON, MICHIGAN

IN THE Morning Mail . .

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Gentlemen,

As one of the many shop teachers in the United States chosen to start and conduct this school, I would greatly appreciate receiving SCHOOL SHOP over here to keep us informed. I formerly taught at the George Washington High School, San Francisco, California.

J. C. UHTE
Centralized Technical School No. 1
England

[Readers interested in the vocational shop program for Army men in the European theater are referred to page 44 of the September, 1945, SCHOOL SHOP for a description of one of the largest vocational schools ever established. *The Editor.*]

Gentlemen,

Again I am taking advantage of your News from Industry service. This service is but one of the fine features of SCHOOL SHOP. To me, the September issue is very interesting and beneficial.

CHARLES REICHLE, Chairman
Industrial-Arts Department
Norwood, Ohio, High School

Gentlemen,

Please find enclosed the coupon from the SCHOOL SHOP News from Industry service. You have certainly developed a magazine which is worthy of the careful study of any shop or drawing teacher. You have my hearty wishes for a continued growth and usefulness of your worthy publication.

CHARLES MCNABNEY
Queen Anne High School
Seattle, Washington

Gentlemen,

My sincere thanks for the booklets and other material I have received to date from the News from Industry service. I appreciate your help very much and also your magazine, SCHOOL SHOP, which is "tops" in its field.

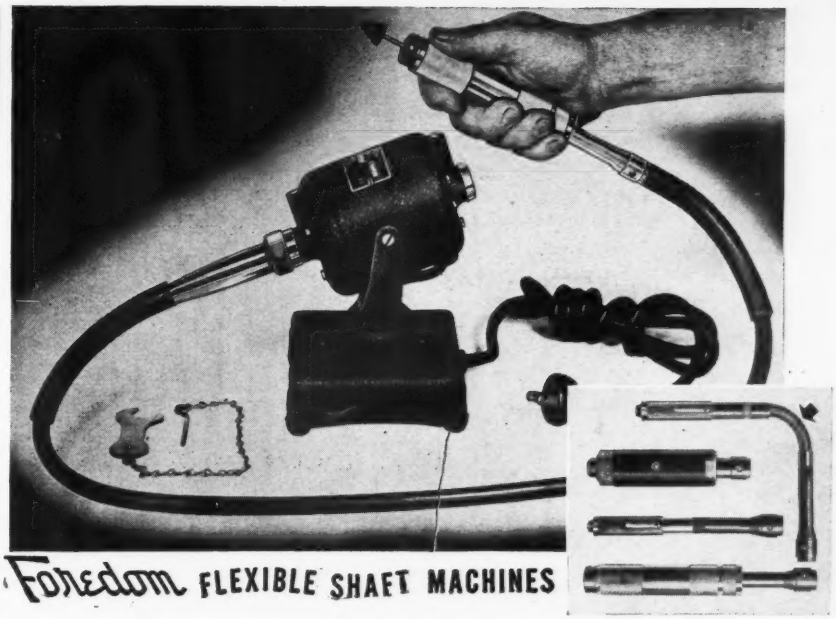
JOSEPH B. KELLY
Public School No. 45
Bronx, New York City

Gentlemen:

Would you be kind enough to send me a subscription blank for SCHOOL SHOP? . . . I am vitally interested in keeping contact with materials of educational interest insofar as my limited time in the service enables me.

L. B. WILLCOX, S.M. 1/c,
U.S.S. General Gordon, Div. N.,
c/o Fleet P. O., New York, N. Y.

[SCHOOL SHOP is maintaining its special rate of $1 a year to servicemen. The request must come directly from them, however, because of postal regulations. *The Editor.*]



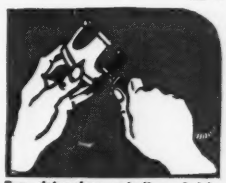
Foredom FLEXIBLE SHAFT MACHINES

4 Quickly-interchangeable handpiece types—pencil size and larger—some with flexible wrist—see arrow.

STUDENTS learn *Faster* with practical *All-Purpose* FOREDOMS!

Teaching is easier and quicker when your shop courses include the practical instruction of Foredom Flexible Shaft Machines. These versatile all-purpose machines are used successfully in thousands of school shops and plants.

Pencil-size handpieces for the hard-to-reach places and larger ball-bearing handpieces for the heavier jobs are all quickly interchangeable. And flexible shafts which really ARE FLEXIBLE make Foredoms A-1 in efficiency. Because Foredom Machines are employed in so many large and small plants, your students will really benefit from their training with Foredoms when they start their shop careers.



For deburring, grinding, finishing, polishing and other light production jobs—particularly valuable on irregularly shaped parts.

3 WAYS *Right!*

1. For de-burring, grinding, finishing, polishing and other light production jobs—particularly valuable on irregularly-shaped parts.

2. In tool and die departments, for grinding, finishing and touching up dies, molds, jigs, etc.

3. For maintenance and emergency needs—touching up set-ups without disassembly, removing high spots on gears, identification marking of equipment, etc.

In die and tool departments, for grinding, finishing and touching up dies, molds, jigs, etc.

THESE SHOP COURSES ALL USE FOREDOMS!

Machine Shop Practice, Automotive Mechanics, Aircraft Mechanics, Plastics, Tool and Die Making, Electrical, Radio, Dental Mechanics, Jewelry and Watchmaking, Model-Making, Woodcraft, etc.

For maintenance and emergency needs—touching up set-ups without disassembly, removing high spots on gears, identification marking of equipment, etc.

THOUSANDS OF PLANTS USE FOREDOMS

Including Ford, General Motors, Chrysler, Nash-Kelvinator, Jack & Heintz, Sperry Gyroscope, Bendix, Westinghouse, etc.

Send for Catalog No. 84 Showing Complete Line and Many Uses of Foredom Flexible Shaft Machines.

FOREDOM ELECTRIC CO.
27 Park Place, New York 7, N. Y.

NEWS

What's Doing in the Field of INDUSTRIAL EDUCATION

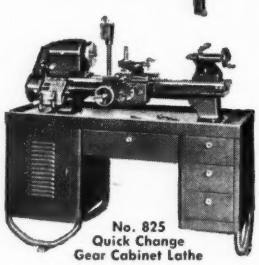
Contest

"PRINTING and World Peace" is the general topic for the 1945-46 Essay Contest sponsored by the National Graphic Arts Education Association in cooperation with International Printing Ink. The contest is open to students in the ninth year of junior high schools, senior high schools, and trade and preparatory schools and particularly in schools where printing instruction is offered. The essays should be from 400 to 700 words in length, and may be typed, written in ink on one side, or printed. The essays must be submitted to the National Graphic Arts Education Association on or before midnight, December 1, 1945. This year marks the 10th Anniversary of the Contest and in keeping with the spirit of the past nine years, is strictly educational in character. Through the years the contest has had the sanction of the National Association of Secondary-School Principals and its Committee on National Contests, Festivals and Tournaments, of which George A. Manning, Muskegon, Michigan, is the Chairman. Letters of praise and endorsement have come from school administrators, teachers, and leaders in every branch of the graphic arts industry. Distinguished citizens from among the professions and business fields serve as judges. Nearly 25,000 essays have been submitted and hundreds of valuable prizes in scholarships, cash, travel, war bonds, and other prizes have been awarded in all parts of the United States and Canada. Thirty-six prizes, totaling $2,200.00 in war bonds, stamps, and cash will be awarded the winners this year, in addition to special prizes and other features to commemorate the Tenth Anniversary. For complete information write to the National Graphic Arts Education Association, 719 Fifteenth Street, N.W., Washington 5, D.C.

Logan A NAME TO REMEMBER WHEN YOU THINK OF BETTER LATHES

The Reason for LOGAN ACCURACY

No. 850 Manufacturing Turret Lathe



No. 825 Quick Change Gear Cabinet Lathe

Accurate work comes from Logan Lathes because accurate work goes into building them. Typical of maximum tolerances allowed are Bed ways within .0005" of parallelism, and headstock bearing faces held to an accuracy of .0005". To maintain such accuracy in lathe after lathe, one of every seven men building Logan Lathes is an inspector, skilled in the use of precision instruments such as Comparators, Johannson Blocks, Sine Bars, and the most accurate of gauges. Using this precision equipment, Logan inspectors check individual parts, sub-assemblies, and completed machines. They make certain, in short, that every Logan Lathe will *work* accurately because every part of that lathe *fits* accurately. This Logan stress on inspection, though costly, is also the wisest economy. Lathes which pass such rigid inspection make friends of the men who use them. Ask your Logan Lathe dealer, or write for full information on all Logan Lathes.

SPECIFICATIONS common to all Logan Lathes: Swing over bed, 10½"; Bed width across ways, 6-15/16"; Bed length, 43⅛"; Size of hole through spindle, 25/32"; Spindle nose diameter and threads per inch, 1½"—8; 12 Spindle speeds . . 30 to 1450 r.p.m.; Size of motor . . ⅓ or ½ h.p., 1750 r.p.m.; Preloaded precision ball bearing spindle mounting; Drum type reversing motor switch and cord; Precision ground ways, 2 prismatic "V" ways, 2 flat ways.

LOGAN ENGINEERING CO.
CHICAGO 30, ILLINOIS D-5

New Construction

THE citizens of Winfield, Kansas, voted more than two to one in favor of a tax levy to raise $325,000 to be used for a vocational building at a special election held recently. J. H. Douglass is director of industrial education and Evan E. Evans is superintendent at Winfield.

Meeting

THE California Industrial Education Association will be host to a combined meeting with the southern sections of the California Business Education Association, the California Agriculture Teachers Association, the California Home Economics Association, and the National Vocational Teachers Association on November 17 at Fremont High School, Los Angeles, California. Among the speakers will be Julian McPhee, state director of vocational education, and Walter Dexter, state superintendent of instruction.

Week

THE 18th Annual Printing Education Week "to perpetuate the memory and teachings of Benjamin Franklin" will be observed during the week of January 14-19, 1946, according to the National Graphic Arts Education Association, sponsors of the observance. Joseph F. Sorace, Rochester Institute of Technology, is general chairman of the activity.

Teacher-Trainers

THE University of Maryland, charged with the responsibility for providing vocational teacher training by the Maryland State Board of Education, has appointed two new associate professors of industrial education to its Department

of Industrial Education in anticipation of urgent demands for trained shop and related-subjects instructors in Maryland and Baltimore City schools. The new appointees are S. Grant Conner, formerly special representative, trade and industrial education, U. S. Office of Education and R. Lee Hornbake, director of manufacturing training, Curtiss-Wright Corporation, Airplane Division, Columbus, Ohio.

Scholarships

IN order to encourage outstanding men to avail themselves of a new program for the training of men for technical and executive positions in the furniture industry, a limited number of scholarships at the University of Michigan School of Forestry and Conservation in the wood technology curriculum are being offered by the National Association of Furniture Manufacturers, the Furniture Manufacturers Association of Grand Rapids, and a few individual furniture manufacturers. Each scholarship carries a grant of $750 for the academic year. Scholarships will be awarded on the basis of ability and promise of leadership to students with junior, senior, or graduate standing who are residents of the northern and western states. Further information may be secured from the Dean, School of Forestry and Conservation, University of Michigan, Ann Arbor.

Plastics . . . . . *from page 9*

Lamicoid—Misa Insulator Co., N. Y. City.
Synthane—Synthane Corp., Oaks, Pa.

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Textiles . . . . . *from page 11*

which will be of most value.

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- Heavy bronze bearings
- 1" Collet capacity
- 11¼-inch swing
- Double-walled apron
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- Extreme accuracy
- Convenient controls
- Underneath V-belt motor drive
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. . . compare a SHELDON S-56 Precision lathe with all other 10" lathes in the moderate priced field, and you'll find more accuracy, more capacity, more convenience, more design, more quality . . . *from any angle just more lathe.*

The SHELDON S-56 lathe has a bed length of 56", with rigid T-girted bed with 2 V-ways and 2 Flat ways which are ground and hand scraped to .0005" of both lateral and parallel alignment. Lead screws are cut on the finest Pratt & Whitney "super precision" lead screw machine. The S-56 lathe with 56" bed is mounted on a rigid 5 drawer steel bench (S-44 with 44" bed on a 4 drawer steel bench) which houses an efficient 4-speed (8 spindle speed) underneath motor drive. Each come with full quick change gears, power longitudinal and cross feeds and standard big lathe features.

SHELDON MACHINE CO., INC.
4260 N. Knox Avenue Chicago 41, U.S.A.
Builders of Good Lathes since 1919.

Radio Shop Instruction Sheet

BY *Joseph Murri*

Here is an example of an instruction sheet that a radio shop teacher has found useful. Joseph Murri teaches in the Edward Bok Vocational School, Philadelphia, Pa.

A VERY helpful teaching device is the "instruction sheet." It meets the requirements of individual differences. However, supervision by the instructor is necessary if the learner is to derive the greatest benefit from its use. The following instruction sheet is useful for a learner in the radio shop.

The R. M. A. Resistor Color Code

I. *Object.*—To develop an understanding and use of the Radio Manufacturers Association (R.M.A.) resistor code.

II. *References.*—(1) Pennsylvania Department of Public Instruction: *Mechanic Learner-Radio.* 1942, p. 339. (2) Trade catalogs.

III. *Information.*—Carbon resistors are used extensively in radio equipment. In order to be able to designate readily the various ohmage values, a standard color code has been adopted by the Radio Manufacturers Association.

While three methods of paint markings on resistors are used, all types have the same color values, as shown in Figs. 1, 2, and 3. The radio worker must be familiar with all types because millions of old-type resistors are still in use in radio sets and it may be necessary to replace any one of them.

R. M. A. Color Code

Color	*Figure*	*Color*	*Figure*
Black —	0	Green —	5
Brown —	1	Blue —	6
Red —	2	Violet —	7
Orange —	3	Gray —	8
Yellow —	4	White —	9

Tolerance Colors

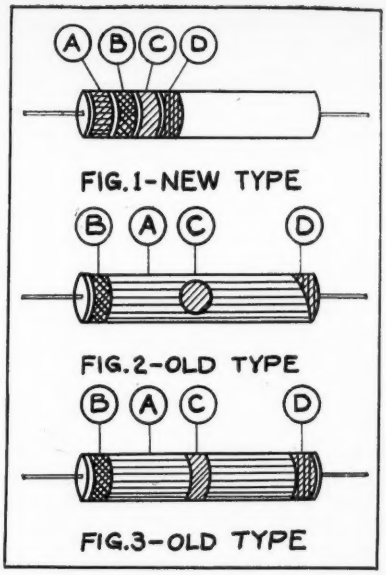
Gold ± 5% Silver ± 10% No Color ± 20%

A—color indicates the first figure of the resistance value in ohms.

B—color indicates the second figure of the resistance value in ohms.

C—color indicates the number of zeros following the second figure.

D—color indicates the percent tolerance (the actual measured value in ohms will be within the plus-or-minus range of the nominal rated value).



IV. *Material.*—Several assorted types of carbon resistors with the R. M. A. color code with numbered tags.

V. *Procedure.*—

1. From the several resistors given you, pick up one and observe if it has three or four color bands placed close together on the resistor. If it has three, it is of the new-type marking; if not, it is one of the old types.

2. After determining the type, proceed to record the following: (*a*) resistor designation number; (*b*) type; (*c*) each color marking and its equivalent number; (*d*) rated ohmage value; (*e*) percent tolerance.

3. Memorize the R.M.A. resistor color code.

VI. *Notes.*—In the old-type resistors, it is possible for the dot and/or the end band to be of the same color as that of the body. A helpful way to remember the color code is to think of the colors of the rainbow.

VII. *Questions.*—*(Continued on page 40)*

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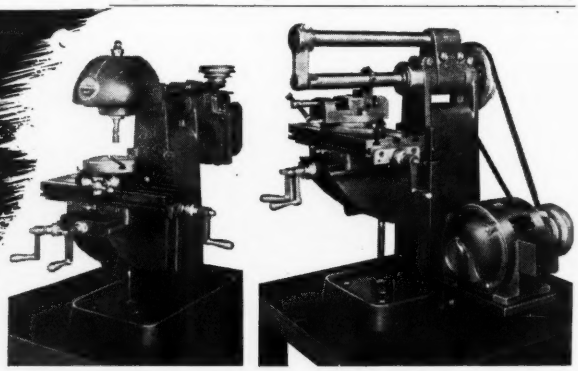

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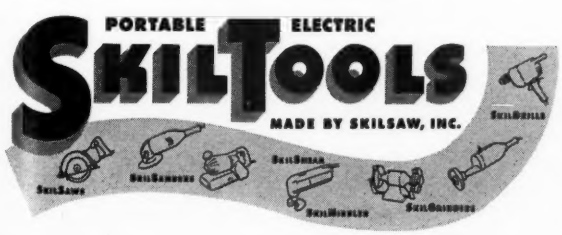

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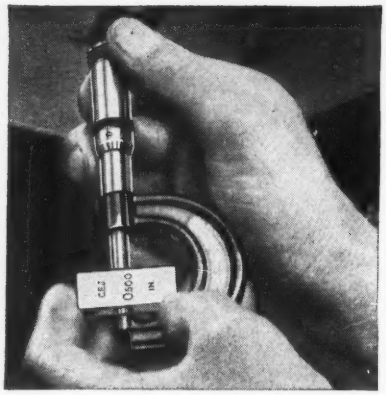

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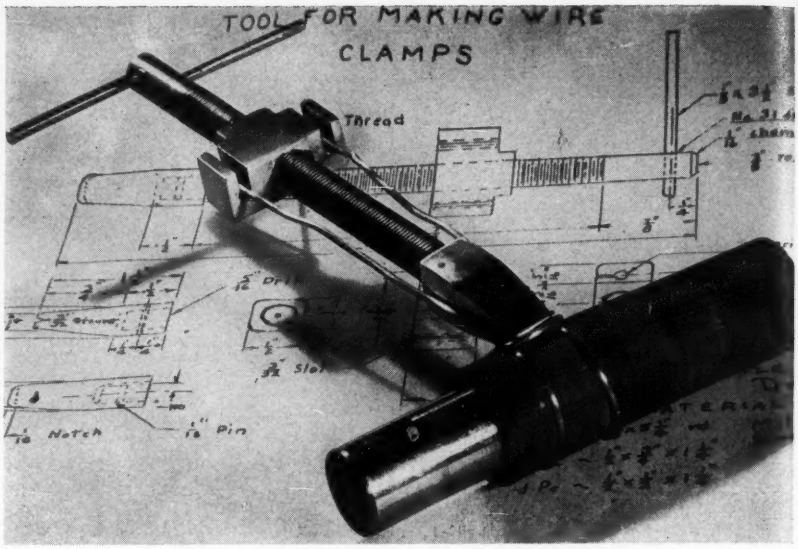


Wire Clamp Tool

BY *J. Clayton Clark*

Teachers of metalworking will find their students very interested in this project which can be used to teach a number of operations. The author teaches in the Santa Barbara, California, High School.

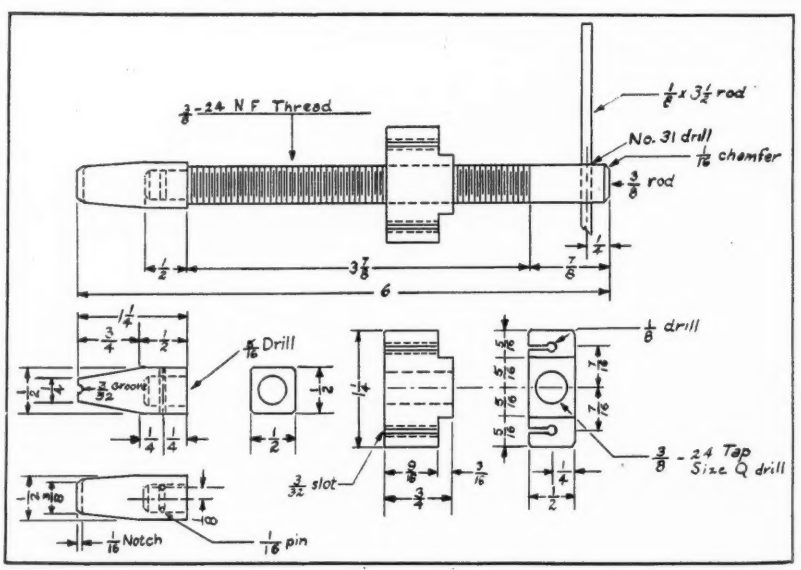
TESTED SHOP PROJECT

THIS wire-clamp tool project has been one of the most popular in our metal classes. The tool is used for installing wire clamps on garden hoses, air hoses, or any type of hose which requires a tight clamp. The tool can be easily constructed in a school shop as a bench or lathe project. Its construction involves many fundamental operations such as drilling, outside threading, inside threading, filing, grooving, countersinking, and riveting. The project requires little in the way of metal, has a real interest appeal to students, and has utility after construction.

Procedures of construction are as follows:

1. Cut 1¼" piece of ½" x ½" mild steel and true ends.
2. Locate and drill holes for 1/16" pins before drilling 5/16" hole in end. Countersink for rivets.
3. Drill 5/16" hole in end of piece.
4. Shape piece according to specifications.
5. Cut 1½" piece of ½" x ¾" mild steel and true ends.

(Continued on page 34)



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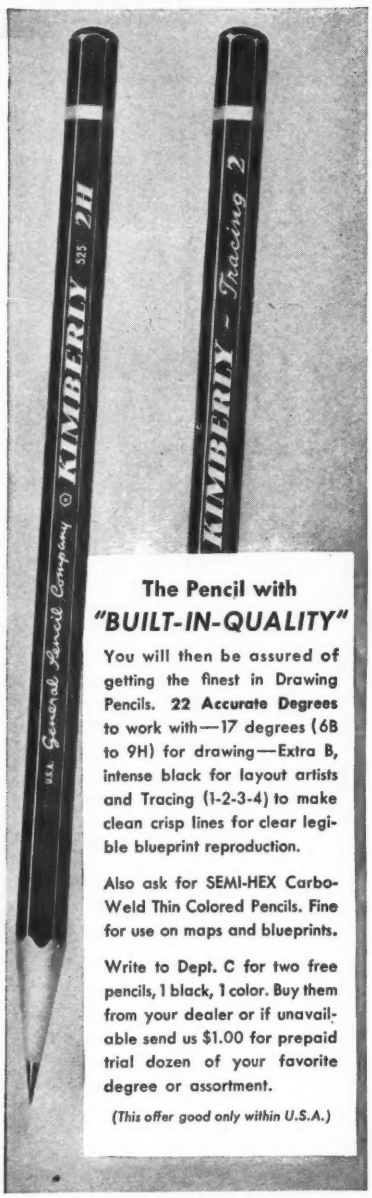

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Drafting-Room Ideas

BY ***Russell R. Mohn***

A little face-lifting is not out of place for the typical school drafting room. Here are some procedures. Russell R. Mohn is head of the Drafting Department, Polytechnic High School, Riverside, California.

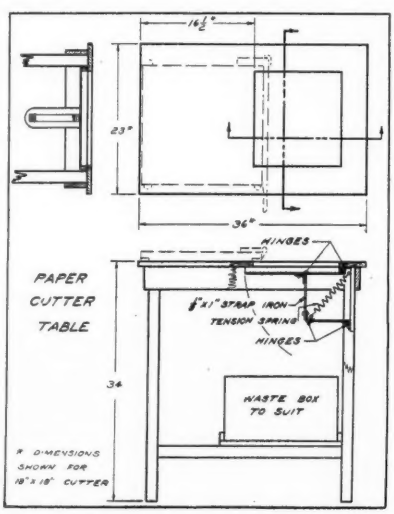
TESTED INSTRUCTIONAL PROJECT

IDEA 1.—In most school drafting rooms the drawing boards present a problem. The conventional basswood board becomes dirty and ink stained and can only be cleaned by sandpapering. Furthermore, the boards get "chewed up" with thumbtack or staple holes if those paper-fastening methods are used.

A solution to the drawing-board problem is to cover one side of the board with 1/8" oil-tempered masonite. Linoleum cement makes a good bonding agent. The masonite should be finished with a suitable primer-surfacer and then several coats of lacquer or plastic paint. A light green color makes a fine appearance and is easy on the eyes. Lines on vellum show up well and India ink, pencil smudge, and dirt can be *washed off* with soap and water!

Idea 2.—A more expensive, but more durable, surfacing material is formica. This material has a layer of colored plastic on the surface, thus eliminating repainting. Formica will stand a great deal of hard wear and can also be washed clean.

Idea 3.—Of course, with a hard-finish board thumb tacks and staples are ruled out as paper-fastening methods. However, scotch drafting tape can be used; and many draftsmen prefer it to other methods. When working directly on vellum, students may find difficulty in getting a compass point to stick in the hard surface. A small piece of scotch tape at the center of the circle will insure that the compass point will "stay put." The use of a circle template for small circles will also avoid difficulty because of the hard surface.



Idea 4.—Another drafting-room problem is the untidiness caused by the mess of trimmings around the paper cutter. Usually very few of the trimmings land in the small waste basket traditionally placed near the cutter. The "trap-door" cutter table illustrated in the accompanying drawing does wonders in keeping the paper-cutter area neat. The trap door is preferred to a long box directly under the cutter blade because often the part cut off needs to be saved. In that case the part to be saved is on top of the door rather than among the trimmings in the box.

Idea 5.—Most drafting rooms have on the walls small charts sent out by manufacturers and supply houses giving decimal equivalents, thread information, drill sizes, etc. Students have to go up close to a chart to read it and may have to consult several different charts in the course of a few minutes. A large wall chart giving most needed information with letters and numerals large enough to see from any part of the room is a time saver and cuts down student movement around the room. Such a large chart made up as a master drawing and blueprinted will find use in other shops.

Idea 6.—Visual aids can be used to great advantage in the drafting room. Following is a bibliography of available aids in mechanical drawing and blueprint reading:

U. S. Office of Education, Washington 25, D.C.
"The Draftsman." 16mm. sound. 11 min.
"Introduction to Mechanical Drawing." 16mm. silent. 20 min.
*"Section Views and Projections, Finish Marks." 16 mm. sound. 15 min.
*"Principal Dimensions, Reference Surfaces, and Tolerances." 16 mm. sound. 12 min.
*"Reading a Drawing of a Bonnett Valve." 16 mm. sound. 12 min.
*Provided with 35 mm. filmstrips for study purposes.

Jam Handy, Detroit, Mich.
"Mechanical Drawing and Drafting." Kit of eighteen 35 mm. slide films.
"Behind the Shop Drawing." 16 mm. sound. 23 minutes.

(Continued on page 40)

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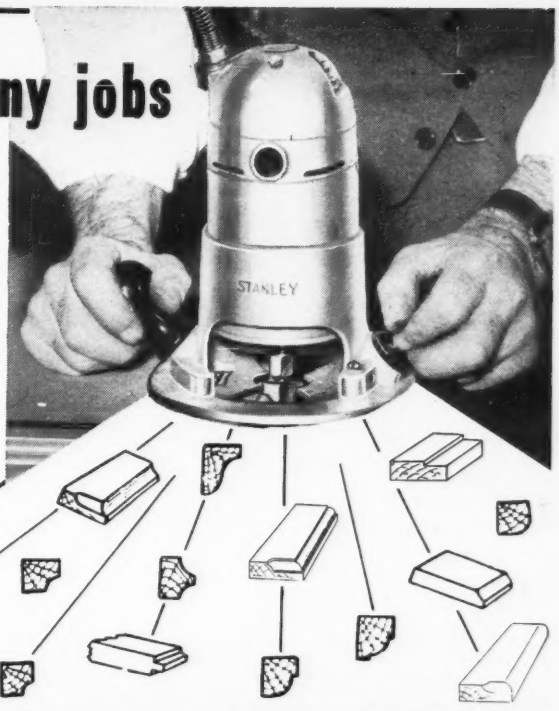

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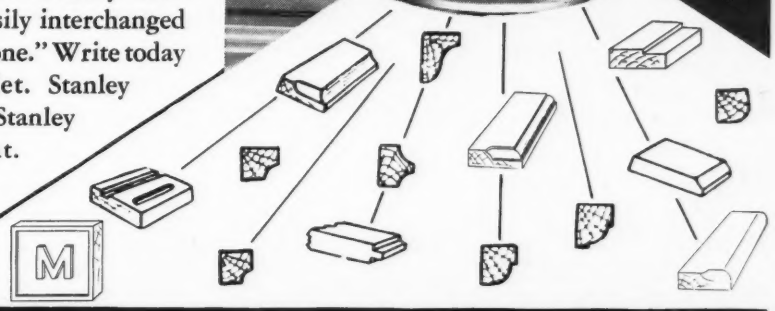

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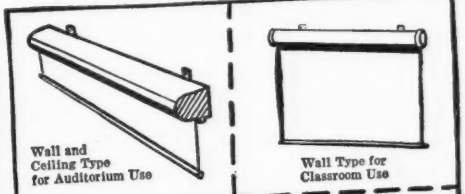

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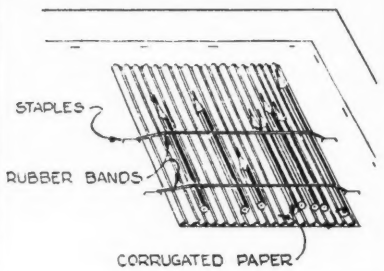
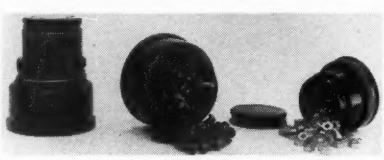
Pencil Retainer for Tilted Drafting Board



Pencils can be prevented from slipping off a tilted drafting board by stretching a rubber band between two staples. Enough friction will be provided by the rubber band to hold several pencils flat against the board. Corrugated cardboard should be inserted to help keep the pencils separated and in line. Pencils can be removed and replaced easily with grades of lead sorted out as most convenient.—*Michael Ligocki, Gary, Ind.*

War Bottle Has Many Uses



When war priorities crowded the tin can out of our daily lives, a leading photography supply manufacturer began selling chemicals in a double-deck glass jar. Shop teachers and home-workshop enthusiasts will find this bottle excellent for keeping machine screws and nuts as well as a dozen varied shop items. It is the correct proportion for screws in the bottom unit and nuts in the top. Both liquid and paste soldering fluxes can be kept in the same bottle, making them always available and conserving space. —*Lawson Miller, Eagle Rock High School, Los Angeles, Calif.*

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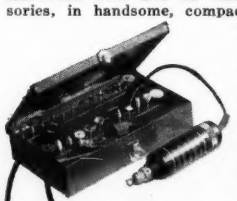

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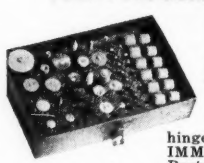

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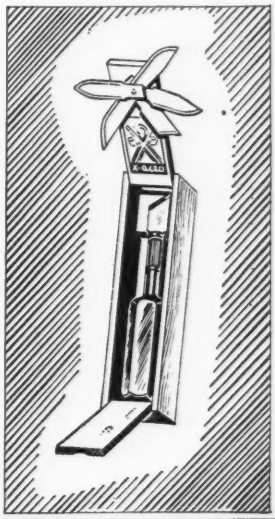

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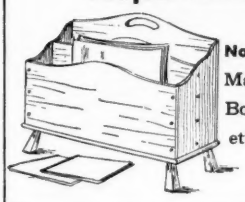
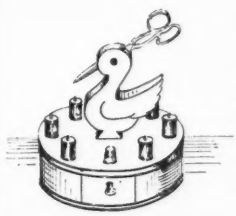
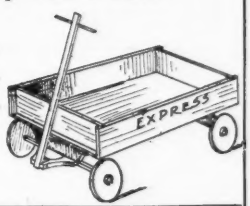


No. 15 – *Small Colonial Furniture:* Bench, Magazine Stands of 3 different types – Book and Cigarette Stand.



No. 19 – *Chests, Racks, Rocker:* Dressing Glass – Child's Rocker – Bedside Chest – Unique Sewing Kit – Portable Towel Rack.

No. 16 – *Children's Toys:* Toy Wagon – Kiddie Push Car – Toy Wheelbarrow – Rocking Horse – Scooter.



No. 17 – *Folding Tables and Trays:* Picnic Case and Table – Folding Snack Table – Combination Tray – Collapsible Bed Tray – Match Box Holder.

No. 18 – *Tables and Stands:* Revolving Book Stand and Table – Folding Card Table – Nest of Plain Tables – Nest of Colonial Tables – Folding Coffee Table.

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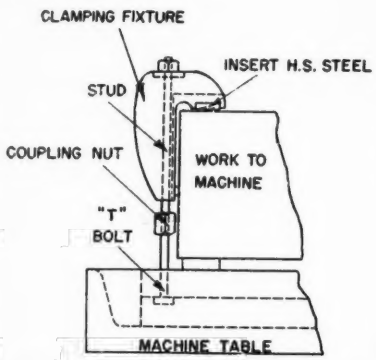
with the point downward into the grease. Many bits can be racked in that manner. When ready to use, simply extract the bit, wipe off the excess grease, and the tool is ready for use.

Racking in this manner makes it easy to move drills about and simple to read the bit sizes. It also keeps the bits from scattering about the workbench and keeps them rust-proof.—*Simon S. Palestrant, W. H. Taft High School, New York City.*

New-Type Clamp



The old system of clamping work to machine tables by means of "U" clamps has been displaced in some applications at General Electric's Schenectady Works as the result of a clamping fixture, suggested by one of the company's workers, which has many advantages.

The fixture is a positive clamp with an inserted hardened steel jaw to prevent slipping. The "T" bolt is fitted with a coupling nut so that by varying the length of the stud used, the clamp may be employed on varying thicknesses of work. Since but a negligible amount of space is needed for fitting the "T" bolt into the table, its full length can be utilized. Previously, blocks to support the "U" clamps took up considerable working space.

The clamping fixture is being used successfully on boring mills, planers, and milling machines.—*C. P. Fisher, Jr., General Electric Co., Schenectady, N. Y.*

Hitting the Guides

It takes a lot of practice for the neophyte to feed sheets correctly to a press. In order to aid him in hitting the guides correctly, I draw a broad line in red pencil diagonally on the tympan. Naturally this is drawn in the direction the sheet is to be fed. This procedure gives the student a course to follow and a great deal of waste is eliminated.—*A. Lewis Herzberg, L. G. Hine Junior High School, Washington, D. C.*

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Clamp . . . . . *from page 28*

6. Drill ⅛" holes as shown in plan.
7. Make slots by using two hacksaw blades in saw frame.
8. Drill and tap center hole.
9. Cut 5¼" piece of ⅜" mild steel rod.
10. Dress down ½" of rod to fit in 5/16" hole in tip of tool. (This may be done by the instructor or pupil on a lathe or it may be done with a file.)
11. Cut groove in rod ¼" from end.
12. Cut threads on rod.
13. Hold rod in v-block and drill with #31 drill for handle.
14. Press ⅛" rod into hole for handle.
15. Polish and assemble all parts.

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Set illustrated is No. 5200 SR

Eight ASSORTMENTS

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No. 4700-R. Same as No. 4700-A with No-drag Reversible Ratchet added.

⅜" Sq. Drive Sets

No. 5200-S. SOCKETS—12 Pt. 3/8"-7/16"-1/2"-9/16"-5/8"-11/16"-3/4". ATTACHMENTS—7 1/2" Hinge Handle, 3 1/2" Extension. Metal Box.

No. 5200-SR. Same as No. 5200-S with No-drag Reversible Ratchet added.

½" Sq. Drive Sets

No. 5400-S. SOCKETS—12 Pt. 7/16"-1/2"-9/16"-5/8"-11/16"-3/4"-13/16"-7/8"-15/16"-1". ATTACHMENTS—15" or 18" Hinge Handle, 5" Extension. Metal Box.

No. 5400-SR. Same as No. 5400-S with No-drag Reversible Ratchet added.

¾" Sq. Drive Sets

No. 5500-N. SOCKETS—12 Pt. 1 1/16"-1 1/8" 1 1/4"-1 5/16"-1 7/16"-1 1/2"-1 5/8"-1 3/4". ATTACHMENTS—18" Sliding Bar, 8" Extension. Metal Box.

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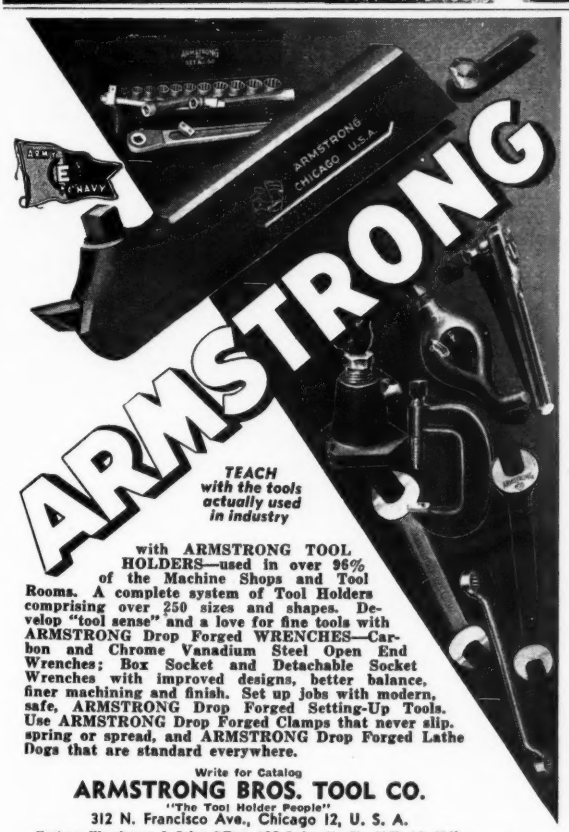

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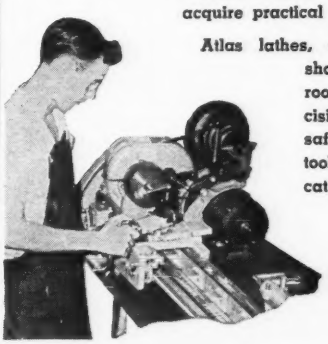

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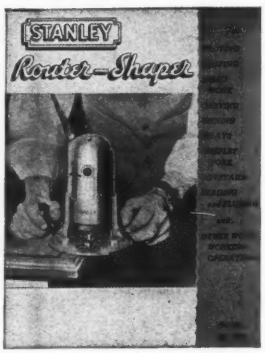
News from INDUSTRY

Stanley Electric Offers Router-Shaper Catalog

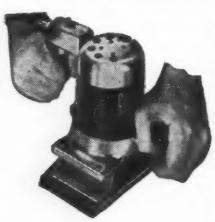


Stanley Electric Tools, a division of the Stanley Works, announces a new catalog, No. 607, which is of particular interest to shop teachers and woodworking hobbyists.

The many uses of the Stanley router-shaper are described and illustrated; such as routing, shaping, relief work, carving, veining, inlays, templet work, etc.

For a free copy of this interesting catalog write to Stanley Electric Tools, New Britain, Connecticut, *or check No. 16 on the coupon.*

Easy Reciprocating Electric Sander



A lightweight, reciprocating sander made by the Detroit Surfacing Machine Company is being widely used in schools throughout the country.

The fast, short stroke; reciprocating action; floating sanding pad; and universal drive eliminate the possibility of cutting swirls, laps, or gouging. These features insure simplicity of operation and result in superior finishes even when used by inexperienced students.

The sander operates from any electric outlet. All moving parts are enclosed. For a bulletin describing it in more complete detail write to the Detroit Surfacing Machine Company, 7433 W. Davison, Detroit 4, Michigan, *or check No. 17 on the coupon.*

Each item listed is numbered. Check the numbers of the items you want, and mail the coupon, properly filled in, to . . .

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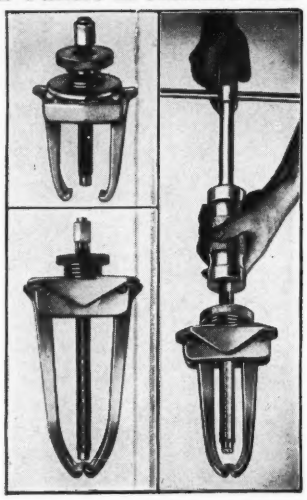
Gear Pullers in Matched Sets



A new series of matched gear pullers is announced by Snap-on Tools Corporation. The series includes three sizes of standard pullers with maximum jaw capacities of 4½", 8½" and 14". In addition, the small and medium sizes are also available in the slide-hammer design. For further information write Snap-on Tools Corporation, Kenosha, Wisconsin, or *check No. 18 on the coupon.*

Steel Stools Available

Lyon Metal Products, Inc., announces the availability of steel stools in 5 heights and 80 models.

The 26-inch stool pictured is equipped with an adjustable back, pressed wood seat (over steel), and steel feet.

For further data on this and other models write to Lyon Metal Products Company, Inc., Clark St., Aurora, Illinois, *or check No. 19 on the coupon.*

Meissner Wins 4th Army-Navy "E"

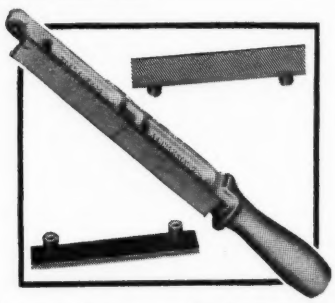
A fourth renewal of the Army-Navy "E" was granted the Meissner Manufacturing Division, Maguire Industries, Inc., just a few days before cessation of hostilities. Termination of the war has freed the Meissner plant to return without time loss to production for the civilian market, and most radio and electronic material is now available. For complete literature on what is ready for immediate delivery write Meissner Manufacturing Division, Maguire Industries, Inc., Mt. Carmel, Illinois, *or check No. 20 on the coupon.*

New Type of Dust Collector

The Standard Electric Tool Company has added to its regular line a new belted motor-driven dust collector.

Designed primarily for 25-cycle current, it is also available for 60 cycles. It is a compact unit used for collecting dust from all types of grinding, buffing, and polishing machines. For full specifications and descriptive literature write Standard Electric Tool Company, 2506 River Road, Cincinnati, Ohio, *or check No. 21 on the coupon.*

New Lathe File



Kennametal announces the development of a new lathe file. In this new design, the Kennametal blanks have brazed-on nuts, as shown in the illustration, and are attached to the light-weight aluminum alloy handle by screws. Two types of blanks—fine and coarse—are available, and are interchangeable on the same handle.

For complete details and price write Kennametal, Inc., Latrobe, Pa., *or check No. 22 on the coupon.*

New Literature

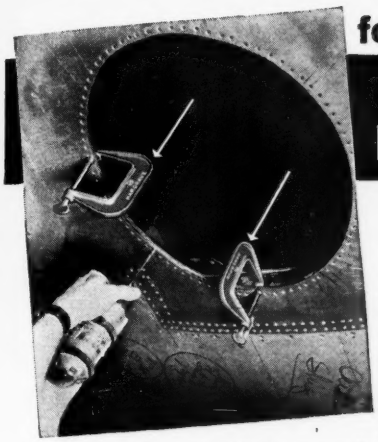
Maintenance Information for the Delivery Truck Operator—1945 Edition is now available from Studebaker Corporation. Information on how to keep trucks in good working condition, as well as on diagnosing truck troubles, is included. Write the Studebaker Corporation, South Bend, Ind., *or check number 23.*

White potentiometers and accessories are described and illustrated in revised catalog E-33A(2) available from Leeds & Northrup Co., 4907 Stenton Ave., Philadelphia 44, Pa., *or by checking No. 24.*

"Handbook of Branch Pipe Outlets" is a handy, 32-page, pocket-size manual for plumbing and other teachers interested in new methods in piping. Illustrates and explains the four simple steps in installing full pipe strength outlets by the WeldOlet Method. Write Bonney Forge & Tool Works, Dept. 261, Allentown, Pa., *or check No. 25 on the coupon.*

Bench or pedestal grinders for tools and general purposes are listed in Bulletin 319A, available from the Baldor Electric Co., 4351 Duncan Ave., St. Louis 10, Mo., *or by checking No. 26 below.*

On Your Tools - *Look*



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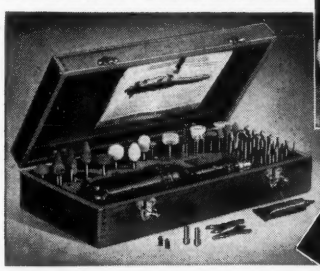

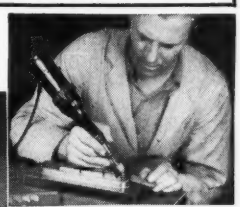

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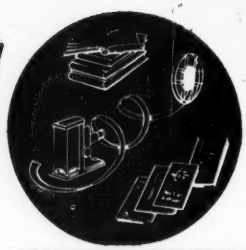

Machine Tool Guide. Plumridge, Boyd, McKinney. Chicago: American Technical Society, 1945. Pp. 630. $7.50.

Machine Tool Guide, a reference text, is a compilation of the catalog material of 61 manufacturers of machine tools.

It shows drawings, dimensions, specifications, and all important data on machine tools and equipment such as automatics, boring machines, broaching machines, contour machines, drilling machines, duplicators, gear cutters, grinders, hobbing machines, lathes, milling machines, planers, presses, shapers, slotters, and tapping machines.

Bound in hard cover with binding posts, the *Machine Tool Guide* has all of the advantages of a loose-leaf binder plus strength and durability.

Tom C. Plumridge is head of the mechanical engineering department, American Technical Society. Roy W. Boyd, Jr., and James McKinney, Jr., are tool engineers at Foote Brothers Gear and Machine Corporation, Chicago.

The Chemical Formulary, Volume VII. Bennett. New York: Chemical Publishing Company, 1945. Pp. xxxii + 474. $6.00.

Previous volumes of the *Chemical Formulary*, issued biennially for the last 12 years, were designed primarily for experienced chemists and technicians. Volume VII, however, has been edited especially for the layman.

It includes more than two thousand formulas covering everything in a long index from adhesives to the various zinc solutions for rust prevention. It contains the latest scientific discoveries in chemistry and industry such as the famous DDT insecticides.

The directions for making the formulas are simple and direct. Most of the ingredients necessary are obtainable at any general or drug store; and for those that are not, the volume contains a long index giving the name and address of mail-order firms handling specific products.

Harry Bennett is editor-in-chief of the Chemical Publishing Company, Brooklyn, New York.

Practical Design for Arc Welding, Volume 3. Kinkead. Troy, Ohio: Hobart Brothers Company, 1945. 100 plates. $3.50.

In this final volume of the Hobart welding design series, Mr. Kinkead has developed three different lines of thought which are of particular interest to the welding designer and fabricator.

Twenty design plates show valuable hints on what *not* to do in designing for arc welding. These plates show common faults in design—and how to avoid them. The next series of plates shows the origin of many complex, modern design principles. The final plates show typical patents that have been granted in connection with the welding process, suggesting that the designer of welded parts may be able to originate new methods that can be protected by patents.

Mr. Kinkead is a prominent welding engineer and consultant.

Creative Hands. Cox, Weismann. New York: John Wiley & Sons, Inc., 1945. Pp. xi + 294. $3.00.

An easy-to-follow guide on practical handicrafts. The reader quickly learns how to recognize the essentials of good design underlying all beautiful creations. Then the reader is guided in applying these principles to the particular craft selected.

The articles mentioned in this book cost little to make. Most material can be found around the home. The tools required are few and inexpensive. Numerous crafts from which to choose are described. The book includes an extensive bibliography.

Doris Cox and Barbara Warren Weismann are faculty members at the University of Minnesota.

Timestudy Fundamentals for Foremen. Carroll. New York: McGraw-Hill Book Company, Inc., 1944. Pp. xiii + 172. $1.75.

A compact reference book which whittles down a technical subject to a simplified explanation, outlining timestudy principles, rating, the use of standard data, and the standard setting process in their simplest forms. Timestudy is presented as an efficient and profitable tool to detect where improvement should be made on the job. Interestingly illustrated.

Phil Carroll, Jr., is a management consultant.

Measurements and Measuring, slidefilm. Part I: for teaching machinists' work, discussion of steel scale, work accuracy, standard of measurement, 50 pictures. Part II: micrometer, how it works, how to read it, vernier scale, gages and gage blocks, 64 pictures. For rental or purchase details, write the Jam Handy Organization, 2900 E. Grand Blvd., Detroit, Michigan. *Please mention* SCHOOL SHOP.

Prevention and Control of Distortion in Arc Welding, 16mm sound, color, motion picture is announced by the Lincoln Electric Company. Prepared by Walt Disney Productions, the film interestingly portrays the expansion and contraction of various metals when heated or cooled. **Running time 20 minutes. Available at no cost except transportation from the Lincoln Electric Company, 12818 Coit Road, Cleveland 1, Ohio.** *Please mention* SCHOOL SHOP.

The Manufacture of Dies, a new 16mm. sound and color film, running time 10 minutes, is available for use on request from the Allegheny Ludlum Steel Corporation. The film describes the manufacture of lamination dies. It supplements other films already available covering stainless, tool, and electrical steels. Write Allegheny Ludlum Steel Corporation, Brackenridge, Pa. *Please mention* SCHOOL SHOP.

How to Weld Aluminum, obtainable in either 16mm. or 35mm. sound, passes along the "know how" for torch welding, arc welding, brazing, and resistance welding. Demonstration welds are made in close-up for each of the welding processes to illustrate the proper technic.

Running time 36 minutes. Rent free. Write Motion Picture Department, Aluminum Company of America, 801 Gulf Building, Pittsburgh 19, Pa. *Please mention* SCHOOL SHOP.

GES-402K is a complete list of the General Electric Company's films and slidefilms having particular educational emphasis and interest. For a free copy, write to the Educational Service Division, Room 2-641, General Electric Company, Schenectady 5, N. Y. *Please mention* SCHOOL SHOP.

Traveling Exhibits. The Division of Graphic Arts of the United States Museum maintains traveling exhibits illustrating the various processes of the graphic arts. Available on loan. For details and schedules write U.S. National Museum, Division of Graphic Arts, Washington, D. C.

Series E of the Industrial Safety Charts series is now available. The chart vividly portrays the *do's* and *don'ts* in the safe use of woodcutting band saws. For sale at 5c a copy from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Supplementary Trainees and War Production is a report of a follow-up survey of persons receiving instruction in supplementary vocational training courses for war production workers. It is a sequel to Vocational Division Bulletin No. 224, Defense Training Series No. 2. The chief revelation of this report is the high degree to which training can be geared to the needs of industry. Available from the Superintendent of Documents, U. S. Government Printing Office, for 15c per copy.

America's Vocational Schools in an interesting, well illustrated brochure recently prepared by the American Vocational Association. It is intended primarily for veterans' counselors, and presents in picture form the training in many of the trades and occupations available to the returning veteran in the nation's vocational schools, and the best methods for him to use in getting this training. Copies may be obtained from the AVA office, 1010 Vermont Avenue, Washington 5, D. C., at the rate of 20c per single copy; 15c per copy in lots of 100 or more.

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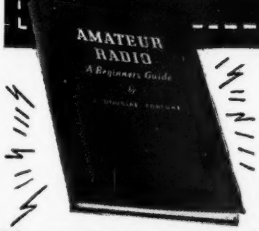

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Drafting Ideas . . . from page 30

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Film Production Co., 3650 Fremont Ave. N., Minneapolis, Minn.
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Floyd W. Cocking, 4757 Constance Dr., San Diego, Calif.
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Films . . . . . from page 16

3. The sound motion picture is a solidly built piece of instructional material. Neither the student nor the instructor can influence or change it much while it is being shown. This is as it should be, because the well-produced training film is essentially a work of art and loses much of its effectiveness if its artistic integrity is not preserved. The filmstrip is designed to overcome this and to permit, even invite, teacher-student participation and discussion.

4. It is in the use of a filmstrip that the greatest opportunities for the instructor to practice "reading a picture" are offered.

In Conclusion

The very use of films as tools of instruction is new and has all the difficulties of everything else that is being tried for the first time. Expert instructors who have used films in training attest their effectiveness. People do not refuse to try things simply because they are "hard" or "difficult" but because they can see no gain from trying. There is every reason to believe that films can do much to assist the instructor in making training easier, more interesting, and more effective. Before these goals can be achieved, all of us will have to learn much more about the use of films, just as we had to learn about using motor cars. As we learn that use we will know better the improvements that we want, and we will secure for ourselves a greater proportion of the benefits possible. This will require selftraining, experimentation, and hard work on the part of every instructor who uses films. This goal cannot be achieved in a day, but gradually the changes that films can make in industrial education may well equal the changes the automobile made in our everyday living during a similar period. Every shop instructor can have a part in bringing this change about and in making it more sound and more desirable.

WANTED
SCHOOL SHOP is looking for good manuscripts in all fields, especially woodworking, visual aids, and radio. Be sure to include good photographs and drawings. Send to
The Editor, School Shop, Ann Arbor, Mich.

from Washington *from page 42*

ly to raise dead issues. Rather, Commissioner Grace will describe the educational programs utilized by the armed services in training 12 million men and women, and then evaluate them in terms of possible modification in educational practice for civilians—young and old.

» The War Department's preinduction training section ended its work officially on November 1. That does not mean that preinduction training as such is coming to a standstill in the nation's schools. The stewardship of PIT believes that even without official needling schools will continue to give youth a background of training to help them be more successful in the armed services.

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Radio . . . . . from page 26

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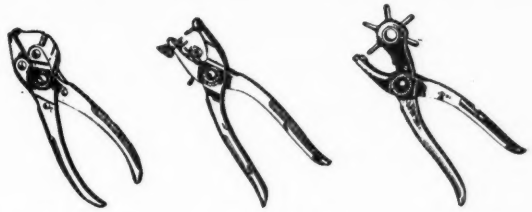

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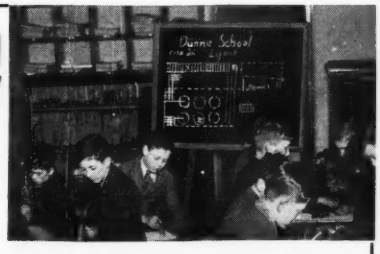

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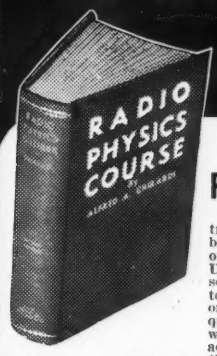

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THE once-mighty War Manpower Commission, which guided millions of trainees to vocational skills and even more millions of war workers to jobs, is now dead. With it expired the Bureau of Training and the Training Within Industry Division. Nothing need be said about the Bureau of Training, since it was one of those Washington monstrosities which "coordinated and correlated." But the Training Within Industry (TWI) stepped up war production by training some 2,000,000 foremen and supervisors. TWI claims that its job instruction methods also "caused more effective use of tools and equipment, reduced accidents, reduced scrap, decreased the number of grievances requiring top management attention, and reduced turnover."

» So much for obituary. But two other units of the former WMC are very much alive. They are the U. S. Employment Service and the Apprentice Training Service and both find themselves at last in their permanent home, the U.S. Labor Department.

With the war over and controls over manpower lifted, the U. S. Employment Service is now turning its attention to *counselling*. In many public employment offices, this counselling is done on an intelligent basis. It is a service which schools and colleges could utilize to good advantage. Because the local employment office is the major source of information on "the labor market," it can keep the youthful applicant informed on what jobs are or will be available, what skills are called for on those jobs, rates of wages and salaries, working conditions, prospects for advancement, and the future of the occupation or industry itself.

In Washington USES officials are nurturing this counselling service by providing the local offices with nation-wide facts on industries and occupations. The USES has already issued counselling pamphlets on nearly a score of industries. Now the USES officers can also utilize the resources of the Labor Department in its counselling work. Soon to be available in every local employment office, for example, are bulletins on the employment outlook for automobile mechanics, aviation occupations, and welders, prepared by the Department's Employment Outlook Branch.

» Somewhat squeezed out of consideration by the urgencies of war and the need for "quickie" training, the Apprentice Training Program is now seeking to return to what it feels is its rightful status. The transfer to the Labor Department, apprenticeship officials feel, will help toward regaining that status. They are also pleased with the attention that veterans are paying to their program. Says Ansel R. Cleary, Assistant Director of Apprenticeship in Washington: "Apprentice training is regaining today the popularity it once enjoyed in the days of the crafts and guilds. This is borne out by the surprising number of veterans who are seeking apprentice training to prepare for industrial trade careers. The automotive, airplane, sheet-metal, plumbing, and allied industries, all report a steady influx of apprentices with veterans outnumbering nonveteran enrollees, in some cases, five to one."

» Dr. Alonzo Grace is having name trouble. This Connecticut educator, who came to Washington to head an important study, is not certain whether to call his staff the Commission on Educational Trends, Educational Developments, or Educational Implications. However, he is crystal clear on the purpose of his commission. It is to study the implications of the educational programs of the armed services for civilian schools and colleges. Since the armed services educational programs were concerned mostly with developing mechanical skills, Grace's study should be of paramount interest to school shop men.

Dr. Grace asked George Fern, erstwhile Michigan State Director of Vocational Education, to study the Army-Navy vocational training technics. Mr. Fern accepted the invitation, although he may give only part time to it.

Lest Commissioner Grace's job be misunderstood, he made clear that the commission (whatever its final name may be) will *not* evaluate the successes or failures of the educational programs designed *by* the armed services *for* the armed services. Nor will the commission point out the weaknesses inherent in programs in which speed in training is a primary goal. These points tend mere-

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